Report of the Committee to Review the Faculty of Engineering & Computer Science

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The Committee to Review the Faculty of Engineering and Computer Science deeply mourns the loss of its members Matt Douglass and Phoivos Ziogas.

To perpetuate the precious wisdom, integrity and humanity of these most dear colleagues, the Committee would like to dedicate this Report to their memory.

Executive Summary

The mandate of a Faculty Review Committee is twofold. In the first instance it is to identify the strengths and weaknesses of the Faculty in the context of its mission statement. Its second function is to identify ways by which the Faculty itself may deal with issues which limit its growth and development in the pursuit of its academic objectives. It is not the intent of this Report to provide detailed, substantive solutions, but to suggest approaches by which the Faculty may maintain and increase its level of achievement and develop and administer its own solutions.

The Faculty of Engineering and Computer Science at Concordia University has evolved over the past 25 years from a small academic unit to a major Canadian Faculty. No matter what measure is used, grants generated, publications, etc., Concordia's Faculty of Engineering and Computer Science is one of the most successful in Canada. Historically, this Faculty has taken bold and innovative steps when emerging areas presented themselves. The resulting successes derived from the dynamism of highly motivated faculty and decanal leadership. The outcome was rapid growth, particularly over the last decade. The most recent issue of Gorman's *Report on Undergraduate Engineering Programmes in North America* places Concordia University's Faculty of Engineering and Computer Science in the top 10% in North America. The most recent graduate appraisal process has rendered analogous positive judgments about many of the graduate programmes currently offered by the Faculty. With its reputation securely established, the Faculty must now reassess its goals, structures and procedures in order to safeguard past gains and to ensure stable, long-term progress.

Many challenges face the Faculty at this juncture. The most crucial of these is the articulation of a shared and consensually-derived academic mission for the Faculty and its component parts. In conjunction with this, the Faculty should establish a clear overall strategic plan by an open and inclusive process. The academic mission of the Faculty and each sub-unit will shape all aspects of the development of the Faculty's strategic plan; it will affect the implementation of the strategic plan at every level and in every activity of the Faculty. The effectiveness of such integrated planning will depend upon the participation and co-operation of all levels of the Faculty. To effect such a change will require the development of a management style, operating mechanisms, and an organizational structure which will enhance such collaborative effort.

It is only by instituting innovative and fundamental changes that the Faculty can begin to address the crucial issue of strategic planning. Such necessary changes include: a modification of management style; a more decentralized structural framework for Faculty governance, which would be conducive to the growth of academic leadership from the grassroots; communication systems which channel information between individuals and groups; and mechanisms for discussion and debates. All of this should promote openness in the decision-making process. Strategic academic planning must include effective and coordinated curriculum development, which will ensure that both undergraduate and graduate teaching are in keeping with the most recent developments in engineering and computer science research. Properly co-ordinated strategic planning will also govern the best allocation of all resources, especially within expected continuing financial constraints.

The Committee feels that increased participation of the constituent units in the decision-making process would allow for a shift in the role of Dean towards more developmental leadership tasks and away from the traditional administrative functions. Such a transferral of interest and energy would be timely in enhancing the external Faculty image and in addressing internal problems which currently detract from the achievements of the Faculty and which need immediate attention: disharmony between certain units; disaffected faculty; the need to promote collegiality; the promotion of the French language; and the urgent issue of gender equity among tenured faculty and in the student body.

At the present time, one of the greatest demands for the leadership of the Dean comes from the general area of the Faculty's relations with domains outside the University. Particularly important for a Faculty of Engineering and Computer Science are linkages with industry. Recently, this difficulty has been exacerbated by linguistic, cultural and demographic transformations in Québec generally and particularly in the industrial sector.

In the past, Concordia's Faculty of Engineering and Computer Science has met the various challenges successfully. The Committee submits this Report in anticipation of its continued success in the future. Herewith is a general summary of the recommendations.

Academic Mission
The Dean should expedite the formal approval of a clear, shared and consensually-formulated Faculty mission statement, which reflects Concordia University's Mission Statement, and which encompasses and is rooted in the mission statements of each academic unit. These mission statements should serve as the core for strategic academic planning within each unit and within the Faculty as a whole.

Strategic Academic Planning
Strategic academic planning within the Faculty should actively involve the participation of all units within the Faculty and should be grounded in the periodic appraisal of all units of the Faculty. It should emphasize the implementation of changes recommended by internal and external review and accreditation processes. An immediate focus should be to review and modify the current structure and function of academic administration in order to provide a framework for implementing the Faculty mission.

Management Within the Faculty
The Faculty should develop a clear organizational structure which will promote the necessary and effective representation of academic units and their constituencies in the planning process. The Dean should delegate increased and well-defined responsibilities for academic leadership to the members of the decanal team, and full descriptions of these responsibilities should be extensively distributed throughout the Faculty. A review of the academic responsibilities and accountability of all academic units should occur and should emphasize the academic leadership of unit Heads.

This resulting structure should provide opportunities to incorporate a more inclusive and open management style which promotes constructive and on-going interaction and collegiality in the Faculty as a whole.

One critical issue which must be addressed is the impact of internal tension on the Department of Civil Engineering. Another issue which needs immediate attention is the current dual function of the Centre for Building Studies, as research centre and as academic unit. A third issue relates to the structure and function of research centres within the Faculty.

Issues of Faculty Members
The Dean should ensure the development and promotion of policies and procedures which will recognize the contributions of faculty members in each and every academic unit and research centre within the Faculty.

Wider participation of faculty members in the decision-making process should be encouraged. The Dean, the decanal team and the Heads of academic units should initiate open discussions about the functions of professors and their role in the processes connected with hiring, tenure, merit and promotion. The Faculty should develop formal policies and performance standards which recognize and promote the contributions of part-time and limited-term appointees.

Teaching
The Dean, the Decanal Team and the Heads of academic units should develop policies and procedures for the enhancement and recognition of teaching as an essential component of professorial responsibilities.

Staff Concerns
The Dean and Heads of Academic and Research Units, in co-operation with representative staff members, should undertake an assessment of the needs and responsibilities of staff groups in the Faculty. The results of the assessment should be put into place and they should be fully publicized throughout the Faculty.

Research and Consulting
The Faculty should develop a Strategic Plan for Research which reflects the mission of the Faculty and which is consonant with the Senate policy for The Enhancement of Research at Concordia. This plan should include a review of the nature of research centres within the Faculty and their role in the strategic planning process. Distinct elements of responsibility for research and graduate studies should be built into the mandates of the Heads of Academic Units, Directors of Research Centres, Graduate Programme Directors, the Dean and members of the Decanal Team.

Student Recruitment
The Faculty should launch a comprehensive and proactive recruitment programme to attract the very best students. Particular effort should be made to recruit female and francophone candidates.

Image of the Faculty
The Dean should develop additional mechanisms to enhance and promote the reputation and image of the Faculty. To do so, the Dean should foster lines of communication within the Faculty itself, within Concordia University and within the broader urban and provincial communities. To facilitate this, all members of the faculty and staff should be encouraged to acquire oral and written proficiency in the French language.

Gender Equity
The appointment of women as members of the full-time, tenured professoriate in the Faculty should become an immediate priority of the Faculty, and a mechanism should be established to incorporate this priority into the academic planning and hiring processes. The full integration of women students and faculty into the Faculty of Engineering and Computer Science should be encouraged.

Complementary Studies
The general subject of Complementary Studies should be addressed through the establishment of an academic unit, the main function of which would be to shepherd such studies into the mainstream of the Faculty's curriculum concerns, and to develop for itself an appropriate teaching and research profile.

I. Preamble

The Committee to Review the Faculty of Engineering and Computer Science was convened by the Vice-Rector, Academic on August 28, 1991. Its composition and terms of reference are set out in Appendix I. The review is part of the general mechanism of periodic appraisal of all Faculties launched by the Office of the Vice-Rector, Academic in the Fall of 1989. This is the first comprehensive review of the Faculty since its inception.

A key mandate of the Review Committee was to produce a summary report. This Report is an analysis by the Committee of the current state of development of the Faculty of Engineering and Computer Science at Concordia University, as revealed during its deliberations. The Report seeks to identify approaches and strategies necessary to the future growth and development of the Faculty in the pursuit of its academic objectives. The Report will be used to inform the process of the search for the next

Table 1

History of Relevant Events in the Development of Engineering and Computer Science at Concordia University

1974
- Establishment of Concordia University and its Faculty of Engineering.

1974/75
- Establishment of the Master of Computer Science programme.

1976/77
- Establishment of the Master of Engineering (Building) programme.
- Creation of the Computer Engineering Option for the B. Eng. Electrical Engineering.
- Establishment of the Centre for Building Studies.
- Introduction of the Doctoral Programme in Building Studies.

1980
- Introduction of the Bachelor of Engineering, in Building Engineering, Computer Engineering and an Industrial Option in the Bachelor of Engineering, Mechanical.

1981/82
- Change of name from the Faculty of Engineering to the Faculty of Engineering and Computer Science.

1983
- Fluid Control Centre changed to Centre for Industrial Control.

1984/85
- Introduction of an Aeronautical Engineering Option in the Master of Engineering programme (Mechanical) in collaboration with École polytechnique and McGill University.
- Introduction of the PhD and Graduate Diploma programmes in Computer Science.
- Establishment of CONCAVE, Centre for Computer-Aided Vehicle Engineering.

1987/88
- Establishment of the CENPARMI, the Centre for Pattern Recognition and Machine Intelligence, and CENSIPCOM, the Centre for Signal Processing and Communication.
- Introduction of co-operative education in Building Engineering and Computer Science.

Dean and for the ongoing process of strategic academic planning of the Faculty and the University.

II. Committee Course of Action

The Committee met 17 times during the period October 5, 1991 to October 27, 1992. An advertisement announcing the establishment of the Committee, including its Terms of Reference, inviting all the members of the Concordia University community to participate in the review, appeared in the Oct. 3, 1991 issue of *Concordia's Thursday Report* (Appendix I). Specific letters of invitation to participate were forwarded to the Rector, the Vice-Rectors, the Faculty Dean, the other members of the decanal team, the other academic Deans, the Heads of academic units and research centres within the Faculty, and the Presidents of the relevant undergraduate and graduate students' associations (Appendix II). The Committee received 18 written responses and 17 individuals appeared before it. In addition, seven companies were contacted for information about the performance of graduates from the Faculty. One response was received.

The Dean was requested to develop and submit a Faculty Self-Appraisal Dossier (FSAD see Appendix III) and any other relevant documents pertaining to the review. To ensure that all major issues and concerns would be addressed in the review, groups of members of the Committee researched specific key issues, and presented these to the full Committee for discussion and analysis (Appendix IV). Additional documentation deposited with the Committee is listed in Appendix V.

The majority of Committee members were present for personal appearances, including the oral presentation made by the Dean and the visits of the external consultants. The Chair and the Secretary prepared minutes of each meeting. These, together with all submissions and presentations, served as the basis of an interim report written by a sub-committee. Dr. Lynn Watt, Professor Emeritus of the Department of Electrical Engineering of the University of Waterloo and Dr. Peter Wright, Professor of the Department of Civil Engineering of the University of Toronto were the external consultants. The Committee produced its final report, after the external consultants' reports were received, (Appendix VI).

III. History of the Faculty of Engineering and Computer Science

The history of the Faculty of Engineering and Computer Science follows from a long tradition established at Sir George Williams University (SGWU) and Loyola College, the parent institutions of Concordia University (established in 1974).

The Faculty is a major strength of Concordia University. From modest beginnings, it has grown to be a large and vibrant focus of undergraduate and graduate teaching, and of fundamental and industry-related research. It has become a key member of the national and international community of engineering and computer science. Starting with the usual common core of engineering, civil, electrical and mechanical, the Faculty has moved innovatively into emerging fields and has developed research and teaching expertise in such areas as computer science, computer engineering and building studies. The relevant milestones in the history of the Faculty are set out in Table 1.

IV. Planning and Management Within the Faculty

It is important in any review process to acknowledge the strengths of any unit and its programmes. In the case of the Faculty of Engineering and Computer Science these are impressive. Details are set out in the FSAD. The real challenge of the appraisal, however, is to identify the weaknesses which must be addressed, if the Faculty is to maintain its momentum for the future. The remainder of this report is presented in this context.

A. Strategic Academic Planning

A process of strategic academic planning ties the academic mission of a Faculty to resource management and infrastructure support. Although the Faculty of Engineering and Computer Science has had planning exercises, no official academic mission statement for the Faculty has resulted. Growth has not always been directly linked to currently available resources, or to the capacity of the Faculty to attract resources in the future. Academic programmes and research activities of the Faculty have been implemented, without sufficient infrastructure support. The resources of the Faculty will be severely stretched in the immediate future, making it difficult to fulfill even its current mandates.

Strategic academic planning will require an in-depth appraisal of all units of the Faculty, within the context of available physical, financial and human resources. Furthermore, the planning process must derive from the mission statement and be clearly articulated, inclusive and consultative. The Committee recommends that:

1. ***The Dean should expedite the process for the articulation, adoption and dissemination of the mission statement of the Faculty of Engineering and Computer Science, within the context of the mission statement of Concordia University, approved by Senate on May 3, 1991.***

2. ***The Dean should establish a mechanism for the implementation of strategic academic planning by the Faculty, to include all of its academic and administrative sectors. This should include a review of the current structure and function of the academic administration of the Faculty. This process should be put in place promptly in order to provide a framework to implement the Faculty mission.***

3. ***The Dean should initiate a process of periodic academic appraisal for each programme and unit within the Faculty, and ensure that Faculty resources are adequate for the fulfillment of the academic mission.***

B. Management Within the Faculty

i) Academic Programme Management

Academic programme management is affected by the administrative structure of a Faculty. There are five major academic units within the Faculty which provide academic programmes for over 2,500 undergraduate and graduate students. As indicated in Fig. 1.2 of the FSAD, all academic units report directly to the Dean. The decanal team consists of two Associate Deans and one Assistant Dean. One Associate Dean is responsible for undergraduate affairs, the other for graduate affairs. They are, respectively, members of the Undergraduate and Graduate Studies Committees of the Faculty. The Assistant Dean is responsible for Planning and Priorities. In addition there is a Special Co-ordinator for Research and External Relations. However, the function, responsibility and accountability of these various administrative officers are not well understood throughout the Faculty.

In Fig. 1.2 of the FSAD, each academic unit is listed as having one member of the professoriate who serves as the Graduate

Programme Director and one who serves as the Undergraduate Co-ordinator. These individuals are not included in the organigrammes for the academic or administrative structures of the Faculty. This suggests that they are not considered as part of the process of academic planning. There is no clear, formal mechanism within the Faculty for the collective establishment of priorities, and the related allocation of resources for the delivery of academic programmes by academic units.

Common issues relating to academic development and planning are discussed in the Faculty Executive Committee which is convened by the Dean and comprises the Associate Deans and Heads of Academic Units. With the exception of the Centre for Building Studies, Faculty research centres are represented on the Executive Committee by the Heads of Academic Units in which they are housed. Informal exchange on curricular planning commonly occurs between individual Heads of Academic Units and the Dean. The Committee recommends that:

4. ***The Faculty develop organizational structures which will promote effective participation of all academic units and their constituencies in the academic planning process.***

The engineering curriculum at Concordia includes a group of complementary courses as required by the Accreditation Board of the Canadian Association of Professional Engineers. A unique feature of these courses at Concordia is that they have been especially designed within the Faculty to promote linkage between engineering, technology and social responsibility. These courses, which include related offerings in other Faculties; e.g. philosophy, science and human affairs, are collectively designated as Complementary Studies. Together with Technical Writing, they provide an invaluable asset for the professional training of students.

As indicated in FSAD (Figs. 1.1, 1.2), the several areas of the complementary studies currently have no formal ties with the rest of the curriculum, nor do they have structural unity. Moreover, the initiative and experience of the individuals who have created and developed these courses have not been sufficiently recognized. The future development of the Faculty can benefit from their integration within the Faculty on an established basis, the Committee recommends that:

5. ***The groups of courses designated as Complementary Studies be integrated into a single academic thrust, to be administered as a formal academic unit, comprising a Head reporting to the Dean, as is the case for the Heads of all other academic units in the Faculty, and associated faculty.***

The academic and administrative organigrammes in the FSAD (Figs. 1.1, 1.2) refer to an Advisory Committee on the Status of Women in Engineering and Computer Science. There is no clear indication as to how this Committee is integrated into the academic structure of the Faculty. The status and function of the Advisor to the Dean on the Status of Women are also ambiguous. In view of the urgency to confront the lack of women students and faculty in engineering and computer science, as well as the dearth of female engineers in Canada, the Committee recommends that:

6. ***The role of the Advisory Committee and the Advisor to the Dean on the Status of Women in Engineering and Computer Science be re-defined and reinforced so as to promote the various issues of women in engineering.***

ii) Management of the Faculty

Over the past 15 years, the management style in the Faculty empowered and promoted individual initiatives. This is indicated by achievements such as:

- the high percentage (over 90%) of faculty members who hold both NSERC and FCAR grants;
- extensive involvement of faculty in networks of Centres of Excellence;
- the establishment of a number of world class research centres;
- the international reputation of individual faculty members;
- the success of undergraduate student groups who have won national and international awards in engineering and computer science competitions.

This management style was effective for the early period of rapid expansion. However, as indicated in some letters and presentations, the lack of open information exchange resulted in feelings of alienation amongst individuals who felt uncomfortable or excluded. Greater effort should be made to develop a more inclusive and open style of management, which would reduce the problem of alienation within the Faculty.

In addition, the following sources of irritation in the Faculty were raised during the deliberations:

- the divisiveness which apparently exists within some units and between others and which hinders the realization of emerging opportunities;
- the perceived competition which currently mars collaboration between the Department of Civil Engineering and the Centre for Building Studies in the area of structures;
- the lack of openness in the process of the allocation of faculty positions;
- the ongoing University-wide controversy concerning teaching versus research, which exacerbates the ill-feeling surrounding the evaluation of the professoriate for purposes of merit, tenure and promotion;
- the need to address the issue of the relatively small number of women in graduate and undergraduate programmes and as members of faculty;
- the lack of consensus amongst faculty in the Department of Computer Science as to its place within the Faculty, and its interaction with academic units outside the Faculty; eg. with the Department of Mathematics and Statistics in the Faculty of Arts and Science;
- insufficient awareness and appreciation of the vital role played by members of staff in the Faculty;
- the need to overcome individual and group counterproductive idiosyncrasies and dissent, and to develop a collegial atmosphere;
- the promotion of fluency in French in the Faculty;
- the need for closer collaboration between the Faculty and the industrial and other academic sectors at the municipal and provincial levels.

These problems have adversely affected the image of the Faculty within the University and in the community-at-large. To improve this image, the Committee recommends that:

7. ***A more inclusive and open management style be adopted which would promote constructive interaction and collegiality within the Faculty, and between the Faculty and the rest of the University and the external community.***

iii) Administrative Structure of the Faculty

The present administrative structure of the Faculty (as represented in the FSAD Figs. 1.1 and 1.2) appears to have undergone little if any significant modification since its introduction in 1974, when the Faculty was smaller and more intimate. During this time the Faculty has grown in size and complexity in terms of programme development, research and involvement in industrial and community activities. This points to the necessity for a review of the administrative structure, including the role and scope of responsibility of the academic unit. The Committee recommends that:

8. ***A priority in the strategic academic planning process should be to review the administrative structure of the Faculty including the role and function of both the academic administration and the academic units. These should be clearly defined and widely-disseminated throughout the Faculty and the University.***

iv) The Department of Civil Engineering

As the recommendations of Drs. Watt and Wright have indicated, and presentations and briefs made to the Review Committee show, the current situation in the Department of Civil Engineering is untenable and must be addressed. Internal conflicts have rendered the Department ungovernable, and have had a detrimental effect on the quality of teaching and the environment for learning. In addition, competition for research resources in the same areas as the Centre for Building Studies, as well as loss of jurisdiction over courses shared with the Centre for Building Studies may have hindered the academic development of the unit. The Department should be given the opportunity to respond fully and critically to the recommendations of Drs. Watt and Wright and to provide an alternative proposal as to how the presence of Civil Engineering might be effectively maintained in the Faculty.

The Committee recommends that in the light of information presented and the recommendations of the external consultants:

9. ***The Faculty should conduct an immediate, date-limited review of the Department of Civil Engineering.***

v) The Centre for Building Studies

A recurring issue during the Review was the ambiguous role and status of CBS which functions as a research centre and at the same time as an academic unit offering academic programmes. Similar ambiguity surrounds the role of the Director of the Centre who has a dual role as research director and head of an academic unit. Such ambiguity has resulted in a number of faculty-wide problems as described by the external consultants (ref: Watt #6, Wright #4). Both consultants have emphasized that it is in the interest of the Faculty to resolve these problems and they have recommended possible courses of action.

The Centre for Building Studies should be invited to respond to the reports of the external consultants, and propose to the Faculty an acceptable format for restructure which would eliminate the ambiguity. The most important consideration in restructuring will be to maintain the current outstanding success and contribution of the Centre for Building Studies to the Faculty. The Committee recommends that:

10. ***The Dean and the Director of the Centre for Building Studies initiate the process to resolve the current ambiguous role and status of the Centre for Building Studies.***

vi) Research Centres

Research centres have significantly contributed to the development and international renown of the Faculty of Engineering and Computer Science. Notwithstanding the long history of their success, the research centres still lack an articulated, accepted and understood role and mission. Consequently, some tensions and confusion have resulted, which can be attributed to the following:

- the apparent dichotomy between a faculty member's role as a member of an academic unit and as a member of a research centre;
- the placement of research centres in the structures of the Faculty and their contribution to their respective academic units;
- the generation of external funding without assurance of the required internal infrastructure support.

Furthermore, there appears to be no common understanding or stated policy of how overhead monies generated by research

centres are deployed. The Committee therefore recommends that:

11. Within the context of strategic academic planning and the development of a Plan for the Enhancement of Research, the Faculty review and define the role and mandate of research centres. Research centres should subsequently be reviewed as part of the process of periodic academic appraisal.

vii) Staff Concerns

The commitment of the secretarial, professional, technical and administrative staff of the Faculty has been demonstrated in many ways. Their efforts are vital for the smooth and efficient operation of the Faculty. Yet there is a perception among some staff that their contributions are not appropriately valued by the Faculty and faculty members. This feeling stems largely from lack of communication, lack of advanced computer technology for their work, exclusion, lack of respect for work, and uneven treatment. Staff members need to be assured that what they do is an integral and important part of the life of the Faculty.

The current practice of professional upgrading of staff members, such as the acquisition of computer skills, should be enhanced and applied uniformly across the Faculty. In addition, staff should be offered an opportunity to take French language courses. Since they are often the front line representatives, they should be able to deal with internal and external contacts in both English and French. The Committee therefore recommends that:

12. The Dean and Heads of academic and research units, in co-operation with representative staff members, undertake an assessment of the responsibilities and needs of the staff in the Faculty. Changes to be implemented as a result of this review, should be fully publicized.

C. The Academic Leadership of the Faculty

i) The Academic Mission and Mandate of the Dean

In the Fall of 1989, Concordia University undertook the development of a university mission statement as part of its strategic academic planning. The Concordia Mission Statement was approved by Senate May 3, 1991 (Appendix VII). The process was extended to the academic Deans, and through them to the relevant Faculties, Divisions and their constituent units.

A mission statement for the Faculty of Engineering and Computer Science is contained in the FSAD. However, it has not yet been widely disseminated, discussed or submitted for formal approval by Faculty Council. The mission statements of the academic units are also contained in the FSAD. These have also evolved without full participation of the professoriate. The process for formal approval of the mission statements for the Faculty and its units should be duly completed. Moreover, the academic mission statements will need to be reviewed continually, if they are to reflect change and affect the strategic academic planning process. The Committee recommends that:

13. The mission statements of the Faculty and its constituent parts be formally approved, and subsequently regularly reviewed as part of the five-year cycle of periodic appraisal and the strategic academic planning process.

Focussing on the internal needs of the Faculty, the Committee noted that morale did not seem as high as one would expect in a Faculty with its clear record of success. In the case of the professoriate, one apparent cause of dissatisfaction is the perceived lack of appreciation and recognition for their achievements and efforts. The Heads of Academic Units and Directors are frustrated in their attempts to realize their full potential as academic leaders because of excessive weight of administrative responsibilities. Another source of frustration is the failure of initiatives caused by competitiveness and lack of collaboration. The Dean and the decanal team should develop a mechanism for ameliorating this situation through recognition and empowerment. The Committee recommends that:

14. The Dean should clarify existing policies and procedures which support and recognize the contributions of faculty members, and where appropriate, develop new ones.

15. In order for the core academic units of the Faculty to realize their full potential, the Dean, in co-operation with the relevant academic leaders, should develop policies and procedures which will empower the academic units and their academic leaders with the necessary authority and resources to match their responsibility and accountability.

16. The Dean should develop policies and procedures which will foster more positive and co-operative relations between individuals and between academic units within the Faculty.

Turning to the external interactions of the Office of the Dean, the Committee notes a general feeling on the part of the Faculty that its efforts are undervalued by the senior academic administration and by the rest of the University. This may result from a lack of information exchange relevant to the accomplishments of individuals, groups and academic and research units in the Faculty, resulting in a lack of appreciation for the accomplishments of the Faculty on the part of the rest of the University. The Committee recommends that:

17. The Dean foster more effective linkages and communication with the rest of the University community.

Further growth of the Faculty could be facilitated by greater participation with the industrial sector, with a major emphasis on the francophone sector. A large number of projects could be initiated, such as joint research and development, the extension of industry-student interaction, the encouragement of the participation of industry and government leaders in the life of the Faculty, the solicitation of financial support, etc. The Committee recommends that:

18. The Dean increase efforts to promote effective and productive interaction with the broader urban and provincial communities, with a special emphasis on the local industrial sector.

19. The Dean provide leadership and encouragement to all members of faculty and staff to acquire oral and written proficiency in the French language, so that they can participate effectively in projects involving the industrial sector.

ii) The Academic Mission, Role and Function of All Members of the Decanal Team

In the context of the academic mission of the Faculty, the mission and roles of the decanal team should be clearly articulated and distributed throughout the Faculty, so as to promote effective governance. The Committee recommends that:

20. The Dean should carry out a thorough review of the organizational structure and functions of the decanal team, within the framework of strategic academic planning.

In light of Recommendation 15 and in the context of Recommendation 20, the Committee recommends that:

21. The Dean delegate increased, clearly-defined responsibilities for academic leadership to the decanal team and the Heads of academic units. The entire Faculty and the University should be made aware of these responsibilities.

iii) The Academic Mission, Role and Function of Heads of Academic Units

The role of every academic unit is central to the academic mission of the Faculty and the University. Over the past few years, the administrative structure of the academic units and consequently, the role of the Heads of these units has remained more or less the same. During this period the Faculty and the individual units have experienced significant growth. These factors in large part explain why the role of the Heads of academic units has increasingly evolved to be more administrative at the expense of academic leadership. A clear definition of the role of the Head of an academic unit as an academic leader is now required. The Committee recommends that:

22. The strategic academic planning process focus on a review of the academic responsibilities and accountability of academic units. The definition of unit Heads as academic leaders should be emphasized.

V. Undergraduate and Graduate Programmes

A. The Undergraduate Programmes

The undergraduate programme offered by the Faculty of Engineering and Computer Science is one of the largest in Canada, with a student population of about 2000. The Faculty offers two undergraduate degree programmes: the Bachelor of Engineering, and the Bachelor of Computer Science. A Certificate programme in Quality Control is also offered. (See Appendix VIII). The Faculty is in the forefront of engineering and computer science education in North America. Some specific factors which have contributed to the distinctive quality of the undergraduate programmes are: faculty hiring policies which have insisted on academic excellence, continual curriculum development and the inclusion of an applied component for even the most theoretical courses. The most recent issue of the Gorman's Report on Undergraduate Engineering Programmes in North America places Concordia among the top 10% in North America.

The future success of the Faculty's undergraduate programmes will require planning, the establishment of priorities and commitment of sufficient resources. Currently, the allocation of resources for programme development is not always based on a long term plan. This is reflected in the chronic problem of critical lack of space, and the injection of short term emergency funds to maintain and upgrade laboratories. These two concerns have been cited in the June 1990 CEAB Accreditation Decisions Report. The future of the undergraduate programmes will remain in jeopardy as long as these problems remain unsolved. The Committee recommends:

23. That the quality of the undergraduate programmes of the Faculty be enhanced through the provision of the necessary physical and financial resources.

The following problems connected with the undergraduate programme also surfaced during the Committee's deliberations:

Undergraduate Student Issues

- the need for increased efforts to attract more top quality students;
- the retention of undergraduate students;
- the need to enhance the quality of student life by improving academic and non-academic facilities;
- the development of ways and means to promote the image of the Faculty and

communicate its achievements to current and prospective students;
- the quality of support provided to students by teaching assistants.

Undergraduate Programmes
- the concern of the CEAB that, with one possible exception, the core science content of undergraduate programmes in Engineering is below the minimum requirement of one-half year;
- the concern of CEAB that non-C.E.G.E.P. students lack the minimum one-half year of complementary studies;
- the concern of CEAB regarding the professional status and affiliation of individual faculty members;
- the concern of CEAB regarding the morale in one particular unit;
- the disciplinary orientation of inter-departmental core courses;
- the possibility of expanding the co-operative education programmes in response to growing student demands.

Considering the recognition that the Faculty of Engineering and Computer Science has already earned, attention to the areas indicated above could bring it close to the realization of its full potential for excellence in undergraduate education. The Committee recommends that:

24. ***The Dean, in collaboration with the decanal team and the Heads of Academic units, seek solutions to the problems listed above as part of the strategic academic planning process and the development of a comprehensive long-term plan for curriculum renewal and development.***

B. The Graduate Programmes

The Faculty of Engineering and Computer Science has undergone remarkable growth in graduate studies over the last ten years. This is in large measure due to the excellence of research programmes of individual faculty members. The reputation of these researchers attracts applicants from all over the world. The sustained high level of research grants and contracts provides for the financial support of many students and for the infrastructure necessary for their research projects. All departments, including CBS, in the Faculty have Masters and Doctoral programmes. In addition, the Department of Computer Science offers a Diploma programme. All of the programmes offered were appraised by the Division of Graduate Studies in the past five years (see the Graduate Programme Appraisals contained in Appendix IX).

However, the infrastructure to support graduate studies has not grown in proportion to the graduate programmes and increased enrolment. The Committee recommends that:

25. ***Within the context of the strategic academic planning process, the Faculty ensure human and physical resources consistent with its graduate programme offerings.***

In the planning process, the Faculty should address the following relevant issues, in collaboration with the Dean of the School of Graduate Studies:

Graduate Student Issues
- availability of faculty members to students;
- integration of graduate students, specially those from outside of Canada;
- the promotion of French language proficiency;
- competitive funding to attract quality students.

Graduate Programmes
- the large number of graduate courses cross-listed with undergraduate courses;
- the predominance of elective courses offered in the immediate supervisor's area, and the dearth of more general course offerings;
- excessive length of time to complete Master's and Doctoral degrees;
- the feasibility of part-time research degrees at the Master's and Doctoral levels;
- the development of policies, procedures and guidelines with respect to the supervision of graduate students;
- the need for streamlining the admission process for all graduate programmes;
- retention of undergraduate students for graduate programmes;
- the poor retention of graduate students which may, in part, stem from standards of admission.

Facilities
- the updating of laboratory equipment, especially computing facilities;
- appropriate technical support for sophisticated laboratories;
- access to high quality computing laboratories;
- the incorporation of new technologies in existing laboratories;
- sharing of faculty and other resources in overlapping areas (e.g. Civil, Building Engineering; Mechanical Engineering; Computer Science and Computer Engineering);
- the inadequacy of library holdings for graduate research.

In the context of Recommendation 25, the Committee recommends that:

26. ***In collaboration with the School of Graduate Studies, the Faculty develop policies and procedures to address these issues.***

C. Graduate Programme Directors

The Graduate Programme Directors (GPD's) in the Faculty of Engineering and Computer Science are the academic leaders of graduate programmes and should be recognized as such. Within the academic units they initiate and co-ordinate graduate curriculum review, renewal and development. They advise students from application to graduation. They are responsible for all aspects of administration connected with curriculum, admissions and comprehensive examinations. In addition, they represent their academic unit and Faculty on University-wide policy making bodies concerning graduate studies. Nevertheless, there is considerable variation from academic unit to academic unit in the duties assigned to Graduate Programme Directors. It would be of benefit to develop uniform, equitable standards not only for the assignment of duties of GPD's, but also for recognition of their contribution. The Committee recommends that:

27. ***The duties and responsibilities of Graduate Programme Directors be clearly defined and articulated and their contribution be recognized on an equitable basis across the Faculty. This should be done in collaboration with the Dean of the School of Graduate Studies.***

D. Curriculum Planning

At the present time, curriculum changes derive by ad hoc processes from individuals, groups and committees within academic units. Curriculum proposals are approved by the academic unit Council and are submitted by the Unit Head to the Associate Dean responsible for curriculum development. The Associate Deans forward these proposals to the Undergraduate Studies and the Graduate Studies Committees, respectively.

Problems which the Committee felt the Faculty should examine within this context include:
- the need for a formal comprehensive strategic academic plan in the Faculty with respect to curriculum review, renewal and development;
- the current lack of evidence of the continuum of undergraduate and graduate education in curriculum planning;
- unevenness in the quality of teaching and in the evaluation of students across the Faculty;
- student advising;
- the major challenge of integrating new technologies and techniques into the entire undergraduate and graduate programme;
- the need for student input into curriculum development;
- the shortage of women faculty to act as role-models and mentors, and the consequent negative impact on curriculum development and recruitment;
- the inadequacy of current library holdings and related facilities, to meet increasing academic undergraduate and graduate needs.

To address these and related problems, the Committee recommends that:

28. ***The Dean charge a Faculty curriculum committee with the task of deliberating on all of these problems and developing solutions as part of the strategic academic planning process of the Faculty.***

VI. Issues of the Professoriate

A. Full-time Faculty

The professoriate of the Faculty of Engineering and Computer Science is one of the outstanding strengths of the University. The contribution of individual professors in research, teaching and technology transfer to industry is impressive. Notwithstanding, the Faculty is faced with a number of frustrations. The most serious of these is the lack of sufficient infrastructure and resources, a fact which confounds efforts to realize aspirations and potential in both teaching and research functions.

There also appears to be some tension among faculty members and senior academic administrators concerning the functions of the professoriate at various stages throughout their careers. It is generally agreed that the functions of the professoriate such as teaching; research; graduate supervision and community service comprise a faculty member's responsibilities. Nevertheless a faculty member may excel in some areas rather than others. The diversity of a Faculty member's contributions must be respected.

There seems to be an ambivalent approach on the part of faculty to the mechanism by which the various activities of the professoriate are assessed and recognized. While the reward system appears to be based on peer review, uniformity in the interpretation and implementation of parts of the CUFA Collective Agreement seems to be lacking, resulting in inequities. These issues of concern to faculty members have been exacerbated by the following:
- the very rapid increase over the past 15 years in the number of academic programmes, faculty members and undergraduate and graduate students;
- the shift in the academic profile of the Faculty from one which focussed on teaching, to one which includes extensive research, graduate supervision and professional training;
- the insufficient interaction between the Faculty and the rest of the University;
- the perception amongst some faculty members that the process of decision-making is confined to a small group of people within the Faculty;
- the ambiguous role of a professional Faculty within an academic community.

The Committee recommends that:

29. ***The Dean, together with the decanal team and Heads of Academic Units develop effective mechanisms for open discussion of the functions of the professoriate and their role in the processes connected with hiring, tenure, merit and promotion, and Faculty governance.***

B. Limited-Term and Part-Time Appointments

The diversity of programmes in various of topics in Engineering and Computer Science requires a considerable breadth of expertise within the Faculty. As a result, the hiring of part-time and limited-term appointment instructors is essential if the Faculty is to fulfill its curricular obligations. The significance of the contribution of these instructors has not been fully appreciated or publicly recognized. The Faculty could benefit from a reassessment of the mutual obligations that exist between itself and these faculty members. These obligations should be clearly defined. One positive step in integrating instructors would be the creation of a formal orientation procedure which would include information exchange. The Committee recommends that:

30. ***In order to develop and maintain standards of quality and teaching excellence, the Faculty should establish policies and practices for the effective integration of part-time and limited-term appointment instructors into the teaching function, and for the evaluation and recognition of their performance.***

VII. The Teaching Challenge

In spite of the fact that good teaching is an integral part of a faculty member's responsibilities, the absence of any specific reference to teaching in the Faculty's mission statement and the limited attention given to it in the FSAD, casts doubt on the value placed on teaching in the Faculty. This impression is reinforced by the fact that, with one exception, the mission statements of the academic units in the Faculty show a similar disregard for the teaching function.

There is no indication that the Faculty, as such, and its academic leaders have assumed appropriate responsibility for the quality of teaching. Nor is there a wide perception that teaching is appreciated and rewarded in the Faculty. As a result, responsibility for teaching has fallen, by default, into the purview of the CUFA Collective Agreement, or has been delegated to the Learning Development Office. Evidently, a general consensus has not been reached in the Faculty about teaching as a primary function of the professoriate. Although there are a number of outstanding teachers, who are indeed committed to superior and innovative teaching, this has been due mainly to an individual professor's personal pride and choice. The status currently accorded to an individual faculty member reflects the Faculty attitude towards research as the primary measure of excellence.

Important issues brought before the Committee relevant to the teaching challenge, and which need immediate address, are the following:

- the mechanisms for constructive evaluation of teaching;
- the support for innovative teaching;
- the need for pedagogical training;
- the development of an internal support system to help faculty acquire language proficiency and teaching skills;
- the need to extend current usage of computer-assisted teaching technology;
- the maintenance and upgrading of current teaching equipment;
- the need to increase teaching linkages with industry;
- the development of a uniform system of student evaluation for all courses.

The Committee recommends that:

31. ***The Dean, the decanal team, and the Heads of Academic Units, develop policies and procedures for the enhancement and recognition of teaching at the undergraduate and graduate levels (the latter, in collaboration with the School of Graduate Studies), and that this become an ongoing process linked to strategic academic planning.***

VIII. Research and Consulting

The Faculty of Engineering and Computer Science has made a significant commitment to research. This is manifest in the formation of at least one highly successful research centre or group within each academic unit. There has been a dramatic increase in publications and in the generation of external research grants by faculty members during the period under review. This focus on research has resulted in the adoption of policies and procedures for hiring, tenure, merit and promotion, which emphasize research as a primary professorial function.

The Faculty faces a number of important challenges vis-à-vis research activities. There is a lack of consensus among faculty members about the linkage between research and teaching, and how the research of graduate students is to be integrated into graduate supervision. The development of critical thinking and creative initiative in students should be a priority in training and supervision. There is a need for an increase in the library holdings in support of research, particularly non-print materials and the relevant technology.

The Faculty must establish a context for the future development of research, to include an extended view of linkages that currently exist between the Faculty and the industrial sector. The Faculty should take steps to bring about more frequent and closer collaboration with the francophone community, and to seek to establish industrial chairs in key areas. These endeavours will certainly enhance the national and international stature of the Faculty. The Committee recommends that:

32. ***Within the context of strategic academic planning, the Dean ensure that the Faculty develops a Strategic Plan for Research, which reflects in its specific terms, the vision and mission of the Faculty, and is consonant with the Senate policy for the Enhancement of Research at Concordia (US 91-2-D12, May 3, 1991).***

33. ***Responsibility for research and graduate studies in the Faculty be clearly defined in the mandates of the Heads of academic units, Directors of research centres, Graduate Programme Directors, the Dean and members of the decanal team. This process should involve the Dean of the School of Graduate Studies.***

Many members of the Faculty of Engineering and Computer Science consult to industry and government. Consulting can be beneficial by focussing research on areas of practical importance and by facilitating reciprocal technology transfer. However, unless handled properly, consulting can distort the priorities of the professoriate, and can engender situations of conflict of interest. The Committee recommends that:

34. ***The Dean, together with the Faculty, and the Vice-Rector, Academic, develop policies consistent with the one-day-a-week consulting guideline of the CUFA Collective Agreement. These should be clearly articulated and widely disseminated throughout the Faculty.***

IX. Gender Equity in the Faculty

The Faculty of Engineering and Computer Science at Concordia must deal with the issue of attracting and retaining women as undergraduate and graduate students and as full-time members of the professoriate. To achieve this, an atmosphere which is welcoming to women must be developed and fostered. There are currently six women professors in the Faculty. Two of these have been recently hired on probationary appointments in the Departments of Computer Science and Mechanical Engineering.

The proportion of female undergraduate students is 14.7% in Engineering and 28% in Computer Science. The proportion of female students at the graduate level is 10% in Engineering and 27% in Computer Science. This is not inconsistent with current national norms in these disciplines. However, the Faculty lacks a sufficient number of gender-specific role models and mentors for young women within its own ranks.

Promotional efforts are currently underway to change the gender distribution in the Faculty. The Dean has demonstrated his personal commitment to addressing the issues through the establishment of an Advisory Committee on the Status of Women in Engineering and through the appointment of an Advisor to the Dean on the Status of Women. What is regrettable, however, is that the personal commitment of the Dean is not widely shared throughout the Faculty. More must be done to respond to this concern and to change the attitudes of individual faculty members. Notwithstanding the challenges, the Faculty was the first in Canada to introduce the Women in Engineering and Computer Science Initiatives (WECOS), a big-sister mentoring programme which provides support for female students at the undergraduate level. This represents a good start in addressing the gender equity problem. But much remains to be done. To quote from the submission of the Committee on Gender Equity on Matters Academic, Advisory to the Vice-Rector, Academic (see Appendix X),

"...the welcome of women in the Faculty of Engineering and Computer Science will be unequivocal only when:
(1) There are substantial numbers of women appointed in tenured positions;
(2) There are women in positions of academic leadership in the Faculty;
(3) The majority of people holding positions of academic leadership in the Faculty knowledgeably and actively support initiatives to include women students and faculty, and to ensure equity in employment and education in the Faculty."

The Committee recommends that:

35. ***The Dean ensure that the appointment of women as members of the full-time, tenured professoriate in the Faculty of Engineering and Computer Science becomes an immediate priority of the strategic academic planning process.***

36. ***That the Dean provide the necessary leadership in the development of a strategic plan for the full integration of women students and faculty into the Faculty of Engineering and Computer Science. This process should consider the recommendations of the Canadian Committee for Women in Engineering, adopted at their conference in May, 1991, and supported by all Canadian engineering deans. It should also include analysis of the various studies done in Faculties of Engineering in Canada, to determine which strategies have been successful in producing long-term substantive change. The decanal team should carry out a study of women in engineering and computer science at Concordia and produce its own plans of implementation for the immediate future. They should avail themselves of the expertise within Concordia in these matters; eg. the Employment Equity Officer, the Sexual Harassment Officer, the Joint Employment Equity Committee, the Advisor on the Status of Women and the GEMA Committee.***

Equitable hiring and promotion policies and practices are now built into the organizational arrangements of Concordia University, and into our Employment

Equity Policies and the CUFA Collective Agreement. The Faculty will be challenged to extend these principles of equity and justice to its curriculum, its teaching practices and materials, its treatment of students, its staff members and female faculty members, and its interaction with the university and non-university communities.

X. The Image of the Faculty of Engineering and Computer Science

The academic reputation of the Faculty of Engineering and Computer Science has grown steadily since its establishment. This is a result of the maturation of its undergraduate and graduate programmes, the nurturing of research as a major activity and the increase in quality and size of its faculty. External peer review rates the Faculty among the best in Canada.

Notwithstanding, the Faculty's image of itself, its image within the University and in the external community, does not reflect the important advances made by the Faculty over the last two decades. There are a number of possible explanations for this discrepancy. It is important to understand these, if the Faculty is to transform its image.

The self-image of members of a Faculty is determined by how closely they identify with each other within a unit, with their colleagues in other units, with their academic leaders and with colleagues from other Faculties and the School of Graduate Studies, and those from outside the University. The review has revealed that some individuals and groups within the Faculty feel demoralized and alienated. There is also a general perception that the formidable contributions of individuals, units, and of the Faculty as a whole, are not appreciated. This is a problem which must be addressed in the first instance by the Dean and the decanal team, with support from the senior academic administration where this is appropriate. It must also be addressed by individual members of the Faculty through daily interactions which promote respect and collegiality, thus minimizing exclusiveness and the impact of competition. Within this context, the Committee recommends that:

37. *The Faculty and the Dean develop strategies to enhance collegiality and the reputation and image of the Faculty.*

Part of the alienation experienced within the Faculty results from poor systems of communication. The informal networks of communication which operated in the Faculty when it was small and intimate, are no longer effective. It is important to replace them with well-defined, formal information networks which reach throughout the Faculty and into the student body. The Committee recommends that:

38. *The Dean, along with the decanal team, address the issue of communication within the Faculty. Once communication systems are developed they should be extended to the rest of the University, the alumni(æ), and the urban and provincial community. The latter activities should be carried out in collaboration with the relevant public relations offices of the University.*

A. Student Recruitment

Ongoing demographic changes in Québec and Canada will undoubtedly impact upon the traditional population pool from which the Faculty draws its students. As part of image building, the Faculty should pay special attention to student recruitment. Perhaps this will entail a direct involvement of faculty members with high schools, C.E.G.E.P.'s and university communities in Montréal, the province of Québec and elsewhere in Canada. Collaboration with the Liaison Office will be essential. The Committee recommends that:

39. *The Faculty launch a comprehensive and proactive recruitment programme involving students, faculty members and alumni(æ). This should include interaction with relevant high school, C.E.G.E.P., university and industrial communities.*

B. Recruitment of Francophone Students

The statistics for student enrolment at Concordia in 1990-91 show that 55%, 12% and 33%, of undergraduate engineering students listed their first language as English, French and other, respectively. The number of francophone students remains significantly low at both the undergraduate and graduate level. One possible explanation for this may be the presence in the city, of francophone institutions which offer academic programmes in engineering and computer science. On the other hand it may reflect the relative absence of a French language capability among faculty members, staff and Faculty spokespersons. The Committee recommends that:

40. *The Dean take measures to promote proficiency in French throughout the Faculty (see Recommendation 19) and, in association with the decanal team and the Liaison Office, develop appropriate strategies for the recruitment of francophone students from the local and provincial environment.*

XI. International Activities and Programmes

International scholarly activities and academic programmes have greatly enhanced the reputation of the Faculty and the image of the University. In some instances these have resulted from the personal initiative of individual faculty members. The Faculty of Engineering and Computer Science has a major commitment to international academic endeavours. These include the following:

- Southeast University - China
- Faculty collaboration - agreement of cooperation
- Jordan University of Science and Technology - Jordan
- Memorandum of understanding
- Indian Institute of Technology at Madras - Composite Materials and Mechanical Engineering
- Research/Faculty/Doctoral Students - agreement of cooperation
- Indian Institute of Technology at New Delhi
- Faculty/Student exchange, research transfer - agreement of cooperation
- Indian Institute of Science at Bangalore
- Faculty/Student exchange, research - agreement of cooperation
- University of Roorke - India Civil Engineering
- Faculty/Student general exchange - agreement of cooperation
- Pontificia Universidade Catolica de Rio de Janeiro - Brazil
- Faculty exchange, collaborative research & teaching - agreement of cooperation,
- Shanghai Jiotong University - China
- Faculty/Student exchanges, collaboration - agreement of cooperation
- University of Costa Rica - Costa Rica
- Faculty collaboration - agreement of cooperation
- Ben-Gurion University of the Neger, Beer-Sheva - Israel
- Faculty exchange, research - agreement of cooperation
- Kyoto University - Japan
- Graduate Faculty/Student collaboration - agreement of cooperation

There are two central issues which face the Faculty in the domain of international activities. First, international programmes should be integrated into the strategic academic planning process. Second, it is essential that individual faculty members and the Faculty collaborate with the Centre for International Academic Cooperation and other units within the University involved in international activities. The Committee recommends that:

41. *The Faculty identify the role of international activities in its Mission and include future development of international activities and programmes in the strategic academic planning process.*

XII. Liaison of the Faculty With the Undergraduate and Graduate Students' Associations

There are two Faculty students' associations, the Faculty of Engineering and Computer Science Students' Association (ECA) representing undergraduates, and the Engineering and Computer Science Graduate Students' Association (ECSGA). The student associations currently participate in Faculty governance, such as academic unit and Faculty Councils and their respective sub-committees.

The Faculty provides both institutional and financial support to the associations. Some of the undergraduate student-organized projects and activities which have benefitted from this support have been: R.E.A.C.H., a summer science camp for elementary school students; the Civil Engineering Bridge Design Competition; Society of Automotive Engineers (SAE) design competitions, and the Engineering Games. The high degree of student participation in association activities is well-known in the Faculty.

The relationship between the Faculty and the ECA appears to be healthy. However, the liaison between the ECSGA and the Faculty needs to be strengthened.

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* *Due to the volume of these Appendices they are available only in the Office of the Dean of the Faculty of Engineering and Computer Science and the Offices of the Vice-Rector, Academic. However, Appendix VI is circulated with the Report.*

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Mr. Guy Vézina
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Appendix VI

External Consultants Reports by Dr. Lynn Watt and Dr. Peter Wright

Review of the Faculty of Engineering & Computer Science
Concordia University

Lynn A. K. Watt,
External Consultant
February 1992

Recommendation 1
That teacher evaluations obtained through the Standardized Evaluation Questionnaire be carried out for every course taught.

Recommendation 2
That the Faculty take steps to determine how many of its teaching staff have made and are making use of the facilities of the Concordia Learning Development Centre and, if the results of that study indicate the need for action to improve the usage, that consideration be given to introducing incentives to encourage the teaching staff to do so.

Recommendation 3
That the Faculty not consider expanding its COOP program at the present time.

Recommendation 4
That the University drop its present policy of reducing the value of Concordia fellowships for holders of NSERC scholarships.

Recommendation 5
That the Department of Computer Science remain in the Faculty of Engineering and Computer Science.

Recommendation 6
i) that the academic programs of the Centre for Building Studies and the Department of Civil Engineering be integrated and placed under the administrative jurisdiction of a new Department of Civil Engineering and Building Studies;
ii) that the Centre for Building Studies be returned to its previous status as a research centre but, recognizing the interdisciplinary nature of the field, that it be established as a Centre within the Faculty of Engineering and Computer Science operating independently of any Department with the Director reporting directly to the Dean.

Recommendation 7
That all research centres be required to undergo a periodic review of their activities.

Recommendation 8
The university should make every effort to provide funding for senior administrative positions in the academic departments to provide relief for the department Chairs.

Recommendation 9
That the Faculty should develop a program to reach students, teachers and counsellors in the schools, particularly at the elementary and junior high school level, to provide them with information on the careers available for women in engineering and on the academic subjects they must take in high school if they wish to enter an engineering program.

Summary of Recommendations

The goals and objectives the Faculty of Engineering and Computer Science has set for itself for the next five years are reasonable and, given continued strong and enlightened leadership on the part of the senior administration and sustained effort on the part of faculty and staff, are achievable. A list of recommendations is given below for convenient reference. They must be read, however, in the context of the report where supporting arguments are given.

Preface:

This report is based on discussion during my visit to Concordia University on January 27, 28 and 29, 1992, on subsequent conversations by telephone, and on my reading of documentation given to me prior to and during my visit. A list of the people I spoke to and the documents examined is contained in the Appendix. Unfortunately, time did not permit me to tour any of the facilities or to examine the library, so any comments on those subjects are based on information I received during the visit and from my reading. This report will form part of the documentation that will be used by the University Review Committee in preparing its report on the Faculty. The review is part of a general program that will eventually include all of the academic units of the university and is aimed at developing an overall plan for the next five years. My task was to examine the Faculty's long range plans and give my assessment of its ability to achieve its goals and objectives. The report contains a number of recommendations and suggestions that I hope will assist the Faculty in this endeavour.

I Introduction:

Concordia University was established in 1974 with the amalgamation of Sir George Williams University (SGWU) and Loyola. The Faculty of Engineering was first established at SGWU in 1963 with programs in Civil, Electrical and Mechanical Engineering and graduated its first students in 1968. When Concordia was formed the Faculty of Engineering at SGWU became part of the new institution. Since its inception the Faculty has grown rapidly to be one of the major Engineering Schools in Canada with five academic units: Departments of Civil Engineering, Computer Science (established in 1972), Electrical and Computer Engineering (renamed in 1988) and Mechanical Engineering, and a Centre for Building Studies (established in 1977). Today the Faculty offers Baccalaureate, Masters and Doctoral degrees in all of these areas. In addition the Faculty has, over the years,

established a number of research centres in fields where it has developed strength. It continues to grow and now looks ahead as it plans for the rest of the decade.

II Planning for the Future:

1. The Mission - Goals and Objectives

The mission statement of the Faculty, as set forth in its Periodic Appraisal Dossier, is a general statement of its role in implementing the mission of the University in the areas of Engineering and Computer Science. The mission statements of the four academic Departments and the Centre for Building Studies are similarly general statements of their particular disciplines. The goals and objectives of the Faculty and the Departments as they look to the future are farsighted and laudable and consistent with the Faculty's past and current activities.

The planning document amplifies the mission statement by identifying a number of areas where the Faculty sees opportunities for future development. The goals are reasonable, but the extent to which the Faculty will be able to achieve them will depend on the resources available - people (faculty and staff) and facilities (space and equipment), and on having in place appropriate academic and administrative structures to facilitate the most effective use of those resources and the farsighted academic leadership needed to make it all work.

The Faculty will face significant challenges over the next five years. Concordia, like other Canadian universities, is being squeezed financially. While this poses problems for all segments of the University, the situation is particularly acute for a Faculty of Engineering and Computer Science, since the fields in theses disciplines are continually changing as new developments in science and technology emerge at an increasingly rapid rate. If it is to continue to serve the community well, the Faculty's programs must continue to develop in response to these changes. But keeping abreast of new technology is costly and will require a significant investment of University resources.

The Faculty, in its planning document, recognizes the importance of responding to change and its past history of doing so successfully gives one confidence that it will be able to meet the challenges that lie ahead. There are a few notes of caution that need to be sounded, however. It is all too easy to be swept up by the glamour of new areas where new technologies need to be developed and applied but, if planning is not done carefully, resources can be spread too thinly. A good example of this is the environmental area which is currently the focus of much public attention. It is important that engineers become involved in seeking solutions to the many problems that society faces in this area but to make a significant contribution will almost certainly require an interdisciplinary approach, based on solid scientific and engineering work, but recognizing also the importance of the political and social dimensions involved in these issues. The Faculty is considering expanding its activities in this field and is well equipped to do so. However, it must avoid the temptation to do too much and concentrate its effort in areas where it can build on existing strength. It must be prepared to accept that there will be some areas that it will not be able cover no matter how important they may be. While this may seem obvious, decisions to curtail activities are always difficult.

I have chosen the environmental area because it was cited as a field in which the Faculty planned to expand its activities but the same note of caution applies to any new ventures. In the past funds were often readily available to support new efforts but that is no longer the case. It will require firm leadership to ensure that new developments do not weaken the existing programs.

2. The Planning Process:

Planning in an academic institution requires a careful balance between "top down" and "bottom up" planning. The senior academic administrators must provide the leadership to initiate the planning exercise and point the direction for future development while also providing the overall perspective to decide, in the end, what is reasonable given the resources available. At the same time the faculty must be involved in developing the plan since they will have the ultimate responsibility for implementing it; without their cooperation no plan, however farsighted, will be successful. During my meetings with senior faculty I had the sense that this balance had been reasonably well achieved. There were a few isolated comments to the effect that the senior administration had not been listening well enough, but the predominant view was positive. No planning process can please everyone, but, as long as there has been effective and wide consultation, the final result will usually get the necessary support.

3. Resources

A. Faculty:

The single most important factor in determining the quality of any academic program is the quality of the faculty. In this respect Concordia's Faculty of Engineering and Computer Science is well served. Members of faculty are normally judged on three activities - research; teaching, both undergraduate and graduate; and service to the community. In all three areas the faculty at Concordia are, in my view, performing well.

a) Research: I did not have access to the CV's of the faculty so I was not able to check their publication records myself. For engineers and computer scientists, however, there is an excellent measure that was available to me, the level of NSERC grants. These grants are awarded on the basis of a rigorous peer review of applicants from all Canadian universities and, therefore, show how well the Concordia faculty stand in relation to their colleagues across the country. On the whole they do very well.

The Mechanical Engineering department has an excellent record. For the year 1989/90, the year for which I had national data, nearly half of the faculty had grants greater than the national average and the overall departmental average was 31% above the national average. This is one of the strongest departments in the country.

The departments of Electrical and Computer Engineering and Computer Science also have good records with total grants close to the national averages for their respective Committees and several individuals with above average grants. Seven members of the E&CE department are IEEE Fellows, a tribute to their international recognition.

The Department of Civil Engineering and the Centre for Building Studies have somewhat less impressive records by this measure, although both units have a few strong individuals.

In summary the research record of the faculty ranges from adequate to excellent and provides a solid base on which to build for the future.

b) Undergraduate Teaching: In assessing the strength of the faculty in undergraduate teaching I will be relying on the comments of the students who are, in the final analysis, the best judges; they are, after all, the "consumers of the product" so to speak. I will not be commenting on the undergraduate program as such, since that has been assessed elsewhere, in particular by the accreditation board, and found to be generally satisfactory.

In my meeting with the students I had a good discussion about their experiences in the program and received a few suggestions as to how it might be improved. There were over few complaints; the students I met were generally satisfied with their courses and with the way in which they were being taught. Indeed, some were quite enthusiastic. While the number of students I met was small, most of them had taken the time to talk to their fellow students so the sample of opinions was greater than the number attending the meeting would indicate. The following are the suggestions I judged to be the most important with my comments and, where called for, my recommendations. The student comments are in italics.

Teacher evaluation obtained thought the Standardized Teaching Evaluation Questionnaire should be carried out routinely for every course.

I support this position. According to the students, the present practice is to carry out evaluations only if requested by the professor. If this is indeed the case, then much of the impact of the program is being lost. The main purpose of teaching evaluations is to provide feedback to the professors to enable them to improve their teaching. If it is not done for every course its effectiveness is lessened. A second purpose is to provide the dean and the Department Chairs with a measure to use in evaluating performance for promotion and tenure reviews. Again the evaluations will give a distorted picture unless they are done for every course. I recognize that some faculty may feel threatened by this but our experience at Waterloo, where evaluations are carried out for every course (and in fact are conducted by the Engineering Student Society) has shown that, when they are done routinely, faculty accept them and find them helpful.

Recommendation 1: That teacher evaluations obtained through the Standardized Evaluation Questionnaire be carried out for every course taught.

All new professors and those who get low ratings on the teaching evaluation should be required to get assistance from the Concordia Learning Development Centre.

I do not agree that this should be required. Such a policy might create resentment and exacerbate the problem and also might not be necessary. I understand that the Faculty has a policy to encourage use of the Centre but I wonder if there has been any study done to find out how much it is used. The students have the impression that usage is low. If that is the case, perhaps the Faculty should consider putting in place some system of incentives to encourage more faculty, particularly the younger ones, to avail themselves of the resources of the Learning Development Centre. It is not just a matter of how to lecture, but also how to best use modern teaching tools, such as audio-visual aids, effectively and how to relate to students. It has always been a mystery to me why universities assume (and they all do) that the granting of a Ph.D., a research degree, also confers on the recipient the knowledge of how to teach effectively.

Recommendation 2: That the Faculty take steps to determine how many of its teaching staff have made and are making use of the facilities of the Concordia Learning Development Centre and, if the results of that study indicate the need for action to improve the usage, that consideration be given to introducing incentives to encourage the teaching staff to do so.

The COOP option should be extended to other programs where it is not now offered.

The COOP option seems to be popular and successful where it is offered and the Faculty is apparently considering extending it. I would urge the university to consider carefully before doing so. There are advantages to COOP - the experience the students gain in industry and the opportunity they have to earn money - but there are also some disadvantages that need to be recognized, not the least of which is the cost. Waterloo's experience shows that, to do a proper job of running a full COOP program is costly and, unless the Province provides extra funding to cover the costs (Ontario does not), it becomes a drain on other activities. Another drawback is that most COOP programs take a year longer to complete. Finally, expansion of the program at the present time would face the added problem of finding appropriate job placements in today's depressed economic market. Even well established programs such as Waterloo's are having problems; a new program would have even greater difficulty.

There are other ways to expose the students to the industrial environment, such as using fourth year projects that involve real world problems and industrial exposure.

Recommendation 3: That the Faculty not consider expanding its COOP program at the present time.

There is a need for more computers and associated peripheral equipment, such as laser printers, that the students can have access to.

This is a problem of allocation of scarce resources. I was puzzled, however, by the continual reference to laser printers which are expensive. I doubt that students require the high quality of the laser printer for very much of their work. Good quality dot matrix printers produce quite acceptable copies and cost a lot less.

There is a need for more study and social space.

This is one aspect of the general space problem faced by the Faculty that I will comment on later.

c) Graduate Teaching and Supervision: In my discussion with the graduate students, the Graduate Program Advisors, the Associate Dean and the Acting Dean of Graduate Studies a number of problems were identified. Generally speaking the students were satisfied with their programs and the few problems they did identify were ones that the Graduate Advisors and the Deans were well aware of. Those that I consider to be the most serious are identified here. I make no recommendations since the graduate administrators know what has to be done. Rather I have included a number of suggestions for their consideration and to lend support to their efforts to find solutions.

i) Length of time to degree:

The time many students spend to complete their degrees is far too long, particularly for the Masters degree, where some spend as long as three to four years in what is nominally considered to be a one year program. This is a problem that is not unique to Concordia, but that does not absolve the university from responsibility for solving it. The problem at the Masters level is often, although not always, caused by supervisors expecting too much form the students, particularly in theses programs. Many Masters theses end up being mini Ph.D. dissertations. The solution is to have strict time limits and a system of monitoring the students progress to ensure that these are adhered to. This cannot be left to the supervisor alone. The student's advisory committee should be involved through regular meetings with the student to receive progress reports and to keep the problem within reasonable bounds.

For Ph.D students the problem is more complicated. In the first place the data are not as reliable for reasons I will discuss below, but it appears that the time to degree can be as long as ten years when it should be three or four years. One of the factors that clouds the issue and makes the problem more difficult to solve is the career path of many doctoral students. A common pattern is for Ph.D students to work full time on their research problem until they reach the stage of writing the dissertation. At this point they often take a full time job and plan to do the writing in their spare time. Inevitably that drags out the process. There is even some confusion as to their status during this time; are they considered to be full time students? Are they registered? Do they pay fees? These problems are recognized by the Acting Dean, the Associate Dean and the Graduate Program Advisors and they are endeavouring to cope with them. As a first step they are trying to get reliable data which will enable them to properly assess the extent of the problem. If it is as serious as they now expect, some action will have to be taken. The following suggestions, some aspects of which may already be in place, are offered for consideration should the need arise:

- Require all graduate students to maintain continuous registration in their program and pay fees. Any student who fails to do so would have to be readmitted to the program should he or she come back later, say with a completed dissertation. Readmission would not be automatic and would be granted only on recommendation of the Department and on payment of all back fees.
- Establish time limits for all graduate degrees. These should be reasonable, but it should be clearly understood that they will be enforced. Then establish a procedure for granting extensions that makes it increasingly difficult to obtain one. For example, the first extension of, say one term, might be granted by the Departmental Graduate Officer on the recommendation of the supervisor, the second might require also approval by the Faculty Associate Dean and all subsequent extensions would be granted only on approval of the Dean of Graduate Studies. The very existence of such a protocol puts pressure on both the student and supervisor to complete the work and, while this will never eliminate all of the problem cases, it can greatly reduce the number that drag on, particularly if the Graduate Dean is tough.

ii) Financial support

The sources of financial support for graduate students at Concordia are the usual ones - research grants, teaching assistantships, and scholarships, both external and internal. Providing an adequate level of financial support for graduate students is a problem faced by all universities. The problem is particularly acute in engineering and computer science because baccalaureate graduates in these fields can, at least in normal economic times, get high paying jobs in industry. This makes graduate school less attractive unless the level of support that the university can offer is reasonable. This is one of the factors responsible for the low proportion of Canadians in the graduate population in these disciplines. Universities cannot compete with the differential. Concordia is further contributing to the problem of attracting top Canadians to the Faculty by its policy of reducing the amount of the Concordia fellowships for NSERC scholars. This practice should be discontinued. Other universities make every effort to attract the top Canadian students and, unless Concordia is competitive in its support offers, it will lose out.

Recommendation 4: That the University drop its present policy of reducing the value of Concordia fellowships for holders of NSERC scholarships.

iii) Resources

The graduate students has the same complaint as the undergraduates about the lack of social space and computer facilities. They raised one other problem; the fact that they are spread out around the campus which makes interaction with their supervisors and other graduate students difficult. This needs to be borne in mind when allocating new graduate student space when it becomes available.

In summary the faculty are generally performing well in discharging their teaching responsibilities in both the undergraduate and graduate programs.

d) Service to the Community: The third area in which faculty are expected to contribute is service to the community. This includes the wider academic community, professional societies, provincial and national committees and other bodies and, in the case of a community. For Concordia these activities are critical. As a young institution that must live in the shadow of McGill in the English community in Quebec and of École Polytechnique in the French community, it must work all the harder on its external image. The Concordia faculty and administration recognize this and, I believe, are doing a reasonably good job in establishing themselves. Indeed some felt that their external image was stronger than their image within the University. In the broader academic community, Concordia's faculty are well regarded. Their success at NSERC is testimony to that. Recently the Dean served as Chair of the National Committee of Deans of Engineering and Applied Science which is recognition, not only of his stature in the community, but also of the regard in which the Faculty as a whole is held.

The faculty are also actively involved with industry, not only in Quebec but outside the province as well. To assist faculty in this respect, the university has recently established an Industrial Liaison Office. Some of the senior faculty expressed doubt about the effectiveness of that operation. This is not surprising to me. Most senior faculty have established their own contacts in industry and do not need the assistance of such an office. For less experienced faculty, however, the help that the office can provide in establishing contacts with industry can be valuable. This initiative should continue to receive support.

B. Support Staff:

During my meeting with the technical and secretarial support staff I had a strong sense of their loyalty to the Faculty. Their morale is good and they appreciated having the opportunity to express their views during the review. They suggested two areas in which they would like to see changes which would enable them to provide even better service. These are space and technical support. The secretarial staff, with a few exceptions, felt that the actual amount of space was generally adequate but often the quality left something to be desired. They referred to office stations without windows and poor air quality. They felt that the first problem could, in many cases, be corrected by more thought being given to the arrangement of the space. Too often the solutions to problems that arose were of a short term nature and did not provide long term relief. The air quality problem, on the other hand, is one that occurs in many modern buildings and is usually not easily solved. They also mentioned the lack of social space where they could get together over coffee and informal gatherings, something that is always good for morale.

The second concern mentioned was the lack of technical support in the use and operation of the office equipment. Several of them felt that when new systems are introduced they do not get enough training in their operation. The result is reduced efficiency until they get up to speed on their own. They recognize that the support staff do the best they can but their load is just too heavy.

For the technical support staff the space problem arises because labs are scattered all over the campus making it difficult to service them properly. They are convinced that better planning in the use of space could alleviate at least some of the problems. They also mentioned the need for more computer equipment.

C. Space:

Everyone I spoke to raised the issue of the inadequacy of the present space allocated to the Faculty and I have referred to the specific problems in the separate sections above. Not only is the actual square footage well below what is should be, but too much of the available space is scattered around the campus and the city and is too often not appropriate for the function it is designated for. This leads to problems in communication and morale. Having said this, however, it is clear to me that the problem has been recognized by the senior administration and, when the new library building is completed and space in it is allocated to the Faculty, many, although not all, of the problems will be alleviated. Even after this new space becomes available, however, the Faculty's allocation will still fall short of what it should be under the formula. This makes it imperative that, in designing the new space, great care is taken to make the most effective use of it. To ensure that this happens there should be wide consultation during the planning process with the faculty, staff and graduate students who will be occupying the space.

D. Equipment:
Since I did not tour facilities I did not have an opportunity to assess the adequacy of the equipment available to the faculty, staff and students first hand. In my meetings I did not hear any major complaints except in one area - computers. Several people expressed the view that the university needs to invest more resources in computer equipment and software and, more importantly, must put less of the resources it does spend in this area into the central computing facility and more into distributed computing.

E. Library:
I was not able to spend any time looking at the library but I heard no complaints about it. Other assessments have found it to be adequate to support the Faculty's teaching and research programs.

III Academic and Administrative Structures:

1. Academic Departments:

The academic departmental structure of the Faculty of Engineering and Computer Science at Concordia is different from that of most other major engineering schools in Canada in three respects: the absence of a Department of Chemical Engineering; the inclusion of a Department of Computer Science; and the presence of a research centre, the Centre for Building Studies, which offers academic programs at both the undergraduate and the graduate level. I will address each of these points in turn.

a) Chemical Engineering: It was suggested to me during one of my visits that the Faculty should consider establishing a program in Chemical Engineering to round out its offerings. However, I did not get the impression that this is really being considered seriously and, in my view, it should not be, at least for the foreseeable future. To provide the necessary facilities and staff to establish a department of Chemical Engineering would be very costly and, unless the Province was prepared to provide the necessary resources, it would mean diverting existing resources which would be a serious mistake.

b) Computer Science: The Department of Computer Science was created in 1972. The location of Computer Science Departments varies from university to university and is as much a product of historical development as of planning. There is no one correct arrangement; what works well in one place may not work well somewhere else. My sense is that, on balance, the arrangement at Concordia is working reasonably well. There are the inevitable tensions between mathematicians in the department, who do not feel entirely comfortable in a Faculty of engineers, and those computer scientists who are more applications oriented who find that association valuable. If the department were to be moved out of the Faculty, some tensions would be removed but others would arise. It is my view, based on my conversations with senior faculty, that the losses arising from such a move would far outweigh the gains. It might be possible to meet the concerns of the mathematicians by developing mechanisms for more contact with their colleagues in the Department of Mathematics and with mathematicians at other institutions nearby.

Recommendation 5: That the Department of Computer Science remain in the Faculty of Engineering and Computer Science.

c) Centre for Building Studies: The Centre for Building Studies was established as a research centre in 1977 when the university received a Negotiated Development Grant from NRC. In the beginning the Centre was involved only in research and graduate work but, in 1980, introduced a baccalaureate program. Today it offers academic programs at all levels. The Centre is, in effect, an academic department and the director of the Centre is a de facto Department Chairman, although his responsibilities and authority differ somewhat reflecting his dual role. This dual nature of the Centre with the accompanying dual role of the Director has created strains in the Faculty. The introduction by the Centre of an undergraduate academic program had the greatest impact on the department of Civil Engineering from which many of the faculty in the Centre came and with whose programs there is the greatest overlap. One of the outcomes of the change in the roll of the Centre is that the Faculty contains two academic units that are roughly half the size of the three other departments, and, in my judgement, neither is as strong as it could be. The situation is also causing problems because the Centre has to be treated differently from the other Departments to enable it to fulfill its mandate. I am convinced that this situation must be corrected. Any solution, however, must recognize that the program in building studies has developed, since its inception, into an interdisciplinary program dealing with a wide range of subjects associated with building science and is not just a program in structures; hence it would no longer fit in a Department of Civil Engineering. Therefore, while any solution should deal with the problem of overlap between the program of the Centre and that of the Department of Civil Engineering, it must also provide the flexibility for the building studies program to reflect the interdisciplinary nature of that subject. As well it must take into account that the program has achieved considerable success and recognition (it is the only such program in Canada). On the other hand the move into undergraduate teaching has apparently somewhat blurred the research role of the Centre in the minds of some, which is unfortunate since it has an important research role to play.

Recommendation 6: i) that the academic programs of the Centre for Building Studies and the Department of Civil Engineering be integrated and placed under the administrative jurisdiction of a new Department of Civil Engineering and Building Studies; ii) that the Centre for Building Studies be returned to its previous status as a research centre but, recognizing the interdisciplinary nature of the field, that it be established as a Centre within the Faculty of Engineering and Computer Science operating independently of any Department with the Director reporting directly to the Dean.

2. Other Research Centres:

In addition to the Centre for Building Studies there are a number of research centres in the Faculty which do not offer academic programs. Most of these centres are located within a single Department and consist of a group of faculty with common research interests who have found it convenient to formalize the structure of their group. This type of structure is common in universities although the details vary. At Concordia research centres are recognized within the university by resolution of the Board of Governors which makes them eligible to receive some infrastructure support from the Quebec government. A few of the centres cross departmental lines and some involve interaction with other Quebec universities. My sense is that these centres are working well.

Nevertheless I believe that all research centres should be established with a sunset clause in their charter or constitution and be subject to a periodic review. It is my understanding that such a review process has recently been put in place for new centres but, at present, does not apply to existing ones; it should. The time frame for such periodic reviews will depend on circumstances, not the least of which is the work load involved in carrying them out, but three to five years if fairly standard, the shorter period where there are concerns, the longer one when there are none. Let me emphasize that these reviews need not be elaborate and should be conducted in a non-threatening way. The purpose is to ascertain if the centre is to obtain external recognition for the research activities of its members and to attract external funding support. While the university may decide to provide start-up funding for centres, it should expect them to be generating enough external funding to fully support their activities within a relatively short time. If they cannot do that there would seem to be little reason for them to exist. After all, faculty members not associated with centres still conduct active research programs.

Recommendation 7: That all research centres be required to undergo a periodic review of their activities.

3. Management Structure and Style:

a) The Decanal Level: The management structure of the Faculty is, with the exception of the Centre for Building Studies which I have dealt with above, standard. The Decanal office consists of the Dean, two Associate Deans, one responsible for undergraduate affairs the other for graduate, an Assistant Dean Planning and Priorities, and a Special Coordinator for Research and External Relations. The structure is serving the Faculty well and I see no need for any changes.

It goes without saying, however, that any structure is only as effective as the people in its. In my view the university has been well served by the people currently in the decanal positions. The management style of the present Dean is an open one and, while an open style can cause problems, such as the perception that faculty members can get special treatment by bypassing their department Chair (they seldom do), it is much better for morale than a closed style of management. I heard some complaints of a general nature about lack of communication from the upper administration but nothing that would indicate a serious problem. Having been involved in senior administration myself for many years, I would remind faculty and staff that, in any communication link, the receiver has to be non-passive as well as the sender.

b) The Departmental Level: The academic management structure at the departmental level again follows standard practice and seems to be serving the departments well. The secretarial staff made a strong case for providing the department Chairs with an administrative assistant. This would provide valuable high-level administrative continuity in an environment where Chairs rotate frequently (the term is three years renewable) and, perhaps more importantly, free the Chairs to spend more time on academic matters. After all Chairs are expected to provide farsighted academic leadership. It is not in the best interests of the university to allow them to get bogged down in administrative detail, an activity for which they may not be well suited. Providing the Chairs with high level administrative support would in my judgement be a wise investment of resources.

Recommendation 8: The university should make every effort to provide funding for senior administrative positions in the academic departments to provide relief for the department Chairs.

c) The Faculty Level: The structure of the Faculty Councils and Committees is standard and seems to be working effectively. I see no reason to change it.

IV. Gender Equity:

The problem of gender equity is one that is being faced by every engineering school in North America. Recently the Federal Government recognized the problem and has taken the initiative through its Canada Scholars Program with its provision for a quota of awards for women entering science and engineering programs in Canadian universities and through its program of funding for Mentor Clubs. The universities for their part have also taken a number of initiatives. At Concordia the Dean has established a position of Advisor on Women's Issues. These are all valuable first steps but the problem is a deep rooted one and will take time to solve.

There are two related problems: the small number of female faculty members and the small number of female students. The two problems are linked and can be

traced back to the school system and attitudes in society in general. There are too few women among faculty in engineering and computer science because there are too few women graduating from the Ph.D programs in these disciplines which is due in part to the small number of women entering engineering at the undergraduate level. This occurs because girls are not encouraged, when they enter high school, to take the necessary courses in mathematics and science, particularly physics. Thus they graduate from high school without the qualifications to enter engineering. Universities are now recognizing that they must work with teachers and guidance counsellors in the elementary and junior high schools and with parents to overcome the stereotyping of engineers that has occurred. By the time the students enter high school they will have already made the choice of courses to take and it is too late.

In my discussions with the Chair of the Advisory Committee on the Status of Women in Engineering it was clear that she understands this and is actively promoting activities that will work towards solving the problem. One of the best approaches is to identify women engineers and women engineering students who can serve as role models and arrange for them to go into the schools and talk to students and teachers. I understand that there are plans to do this and these efforts should be given the full support of the Faculty and the University.

Recommendation 9: That the Faculty should develop a program to reach students, teachers and counsellors in the high schools, particularly at the elementary and junior high school level, to provide them with information on the careers available for women in engineering and on the academic subjects they must take in high school if they wish to enter an engineering program.

V. Conclusion:

I believe that the Faculty of Engineering and Computer Science at Concordia University has set itself reasonable goals and objectives as it plans for the next five years and that the Faculty is well placed to reach them. To be sure the Faculty faces some real challenges, but, with continued strong effort on the part of the faculty and staff and with strong leadership from the senior administration, I believe that it will be equal to the task. While there are some internal problems, mostly of a structural nature, I did not identify any critical weaknesses. The suggestions and recommendations which I have made are designed to assist the Faculty in its efforts to reach its long term goals and objectives. I am fully confident that it will be successful in doing so.

Report Appendix

People and Groups Consulted:

During the Visit:

1. Members of the Review Committee
2. Vice-Rector, Academic
3. Dean of the Faculty
4. Associate Deans for Undergraduate and Graduate Affairs
5. Assistant Dean for Planning and Priorities
6. Special Coordinator for Research and External Relations
7. Associate Vice-Rector, Academic (Research)
8. Director, Research Services
9. Director, Industrial Liaison Office, Research Services
10. Directors of Research Centres
11. Acting Dean of Graduate Studies
12. Graduate Program Directors
13. Department Chairs
14. Director, Centre for Building Studies
15. Senior Members of Faculty (13)
16. Members of Secretarial and Technical Support Staff (11)
17. Chair of the Advisory Committee on the Status of Women in Engineering
18. Members of the Undergraduate Student Body (6)
19. Members of the Graduate Student Body (6)

After the Visit by Telephone:

1. Director of Research Services (for clarification of data)
2. Coordinator of Social Aspects of Engineering

Documentation Received and Reviewed:

1. Periodic Appraisal Dossier Prepared by the Faculty (including Appendix A on Course Enrolments)
2. Reports of Earlier Appraisals
3. Minutes of Meetings of the Review Committee
4. Supplement to the Submission to the Committee from the Director of the Centre for Building Studies
5. Draft Report prepared by the Vice Rector
6. Working Group Report on Research and Industrial Issues
7. Annual Reports of the Faculty for 1989-90 and 1990-91
8. CONCAVE Research Centre Report-Status and Future Goals
9. Data on Research Funding

A Review of the Faculty of Engineering & Computer Science

For the University Review Committee, Concordia University

Peter M. Wright,
External Consultant

June 15, 1992

I. Introduction

Prior to being invited to act as a consultant to the Review Committee, I had limited knowledge of the Faculty of Engineering and Computer Science. Like many civil engineers in Canada, I knew that the Faculty's Department of Civil Engineering had been split in about 1977 in order to form the Centre for Building Studies. It was not a decision that I endorsed at the time because of its potential to harm the Department of Civil Engineering. Later I became more aware of the Faculty in general through my involvement in 1978 in the organization of the First Canadian Conference on Engineering Education which was hosted by the Faculty at Concordia University. Thus with the one exception I approached the responsibilities of consultant without special preconception.

After accepting the responsibilities, I was provided with the following documents

Recommendation 1:
That the Faculty develop a new mission statement and strategic plan.

Recommendation 2:
That the University take the necessary action so that the basic academic unit of the Faculty of Engineering and Computer Science is the department with each department chair having significant freedom of action in the administration of programs and resources.

Recommendation 3:
That the term of office of a department chair be five years once renewable, and the term of office of the dean be seven years, normally not renewable.

Recommendation 4:
That within 5 years an academic department of building engineering be created within the Faculty of Engineering and Computer Science which would assume responsibility for the academic programs and students in building engineering.

Recommendation 5:
That the academic programs of the Department of Civil Engineering be phased out over the next five years and the Department dissolved.

Recommendation 6:
That Concordia University establish a task force which would codify the purposes of units such as Centres and Institutes, and the procedures for their establishment and dis-establishment.

Recommendation 7:
That the Faculty of Engineering and Computer Science examine the feasibility of introducing a transition program for new first year students.

Recommendation 8:
That the Faculty examine the feasibility of introducing a Professional Experience Year program for students who have completed either Year 2 or Year 3.

Recommendation 9:
That all academic staff in the Faculty be encouraged to conduct course evaluations, and that the University seek to have the union agreement modified so that course evaluations are required in all undergraduate courses.

Recommendation 10:
That the undergraduate student body with the cooperation of the academic leaders of the Faculty and Departments develop a graduating student gift program.

Recommendation 11:
That the Faculty examine ways in which the time to completion for a masters degree can be substantially reduced for those who are primarily full-time students.

Recommendation 12:
That the graduate units of the Faculty collectively examine their procedures and expectations of graduate students so that they can be documented for circulation among graduate students and staff.

Recommendation 13:
That the Faculty's departments ensure that Ph.D. comprehensive examinations are held, as required by the existing regulations, within the first 18 months and in any event not later than 24 months after registration in the program.

Recommendation 14:
That the rate paid for teaching assistantships be standardized and the number of hours per assignment established beforehand.

Recommendation 15:
That the initial review of new academic staff members be conducted mid-way through their third year.

Recommendation 16:
That the Faculty with the assistance of the University introduce an affirmative action program for the recruitment of francophone/bilingual academic staff.

Recommendation 17:
That the Faculty with the assistance of the University initiate a program of financial assistance which would encourage excellent women undergraduates to pursue graduate studies and thence academic careers.

Recommendation 18:
That the Faculty become more assertive in the organization of continuing education courses in subjects of particular interest to engineers, technologists, and others.

Recommendation 19:
That the Faculty of Engineering and Computer Science seek to eliminate the practice of double numbering common undergraduate and graduate courses both within the Faculty and within the University.

Recommendation 20:
That the calenders for the Faculty contain reasonably precise information on the courses to be offered in any one year.

which I read before the site visit:

- the 1988/89 and 1989/90 annual reports of the Faculty
- sections from periodic reviews of graduate programs and of undergraduate programs by the Canadian Engineering Accreditation Board
- minutes of the Review Committee including most of the submissions to the committee and draft reports of working groups.

Later I received:

- the 1991/92 undergraduate and graduate calendars
- the Faculty's self-appraisal document

Taken together these documents yield a somewhat mixed picture of the Faculty of Engineering and Computer Science. On the one hand, they portray a Faculty which in just over 25 years has made great progress often under difficult conditions in establishing recognized undergraduate and graduate programs, and successful research centres. On the other hand, some of the material reveals serious differences internal to the Faculty, and between the Faculty and the University. The visit to the University provided the means by which I came to reconcile the two images.

Appendix A contains the details of the itinerary. With the exception of the meeting with members of the alumni, the schedule was as organized by the University. (My wife and I also very much enjoyed a private dinner on March 24 with Professor and Mrs. D. Hamblin whom I had known at the University of Saskatchewan in the early 1960's.) Everyone was forthcoming about their perceptions of the strengths of the Faculty of Engineering and Computer Science, and of some of its shortcomings. All had respect for the Faculty, for its past achievements, and for its future contributions to Concordia University and the community it serves.

Finally, throughout this report I have used the term "department" when referring to an academic unit and the term "centre" when referring to a research unit. Thus on occasion the Centre for Building Studies is included within the set of departments.

2. The Faculty's Mission and Strategic Plan

As one examines the achievements of the Faculty of Engineering and Computer Science, it is apparent that there must have been a plan which has been followed over the years. In terms of hiring policy, the academic staff who were engaged conduct their research in relatively well-defined areas. Out of this strategy has emerged very successful research centres which have brought much credit to the University. Indeed half of all research funds coming to the University has been awarded to members of the Faculty and this funding in turn has contributed to the richness of the undergraduate programs.

Twenty-five years later, the Faculty should develop a formal mission statement and strategic plan, one to which all elements of the Faculty have contributed. Now that the research side of the Faculty has progressed so far, other aspects such as teaching and community service may need to be given somewhat greater emphasis.

Recommendation 1: That the Faculty develop a new mission statement and strategic plan.

3. The Space Needs of the Faculty

The matter of the space requirements of the Faculty has two dimensions. First, it has been amply demonstrated by others that the Faculty has been short of space for many years, and only now does it see any relief with the construction of the new library. It is a wonder that the Faculty has managed so well given its limited space.

The second aspect of the space needs of the Faculty is the widely held perception within the Faculty that, when it comes to space, it has been the unit which has suffered the most in the University. It has even been suggested that most of the University's shortfall in space has been absorbed by the Faculty. This perception may not be correct, but at the very least it signals a breakdown in communications between the central administration and the members of the Faculty. I would urge the University to do what it can to show that space shortages have been shared in a reasonably equitable manner.

4. The Organization of the Faculty

From my readings and interviews, it is clear that there are unresolved tensions within the Faculty, and thence between the faculty and the central administration of the University. The resolution of these tensions is very important to the future health of the Faculty and thus of special concern to the Review Committee.

The key question to be answered is "What is the root cause of the tension?" If one believed some of what has been submitted to the Review Committee, it is the style of leadership. I myself am convinced that the source of the dissatisfaction lies instead in the university-mandated structure of the Faculty. The current dean and his immediate associates have provided strong leadership and to them must go much credit for the present strengths of the Faculty. But leaders of faculties only rarely avoid the inevitable decrease in support for their decisions. The same thing would happen in a country if citizens did not have the assurance that they might affect a change at the next election.

The Faculty of Engineering and Computer Science has essentially the same structure as it had in the 1960's when it came into being and was a fraction of its present size. The University decreed that the Office of the Dean would be powerful and central to most decision-making, and that there should be weak structures at the department level. To further complicate the matter, centres have emerged which compete directly with the departments for resources. The term for the dean although nominally five years is in fact much longer due to the manner in which reappointments are conducted. The lack of units within the Faculty whose leaders have significant authority and responsibility means that it is difficult for others to develop their abilities as academic leaders. One result of this university-mandated structure is the current situation and the solution is to make the department the basic academic unit of the Faculty.

Recommendation 2: That the University take the necessary action so that the basic academic unit of the Faculty of Engineering and Computer Science is the department with each department chair having significant freedom of action in the administration of programs and resources.

There are many models in Canada which can be studied in order to establish the most appropriate model for Concordia University. But in the end, the base budget of a department will be fully defined and the base budget of the Faculty Office including the office of the dean will be relatively small. Departmental chairs will administer their own equipment budgets and have responsibility for trust funds given to their units. Undergraduate students except possibly those in Year 1 will be counselled and have their courses approved at the departmental level. Similarly graduate students will be administered from departmental offices.

A fully functioning departmental office will consist of a chair, one or more assistant or associate chairs who assume certain designated duties on behalf of the chair, and, last but not by any means least, sufficient support staff including senior administrative assistants. Based on the present situation, five units as described above, would be established within the Faculty.

In the type of structure envisaged, research centres would continue to have their own directors but they would normally report to the appropriate chair. Although it is possible that research centres whose research interests are multi-disciplinary could come directly under the dean, such arrangements should be avoided. Instead those directors should report to two or more chairs thereby avoiding any suggestion of special advantage. The one exception to this arrangement might be the unit responsible for complementary studies.

It will be necessary to redefine the role of the dean and of the Faculty Office in light of the enhanced role of departments. The most visible function of the dean in the new structure will be as the spokesperson for the Faculty both within the University and in the community at large. The individual would be expected to undertake major committee assignments at the highest levels of the University, often acting on advisory committees to the rector and vice-rectors.

Within the Faculty, the dean will be looked to for leadership in developing new initiatives both in programmes and research. The dean or a designate will be a member of all Faculty Council committees. Perhaps his or her most important role will be as the key person in allocating changes in the resources available to the Faculty. Thus if a budget increase for the Faculty has been obtained, the dean will have responsibility for the process which results in changes to the base budgets of departments. A similar process would be used to assign base budget decreases, one-time budget decreases, undesignated alumni donations, and other such funds. Changes to the base budget of a department will occur only after consultations between the dean and the department chair, and then only in a manner acceded to by the chair. Given that agreement can not be reached the chair might choose to resign but that will be a rare occurrence.

With the introduction of a two-tiered system within the Faculty, it will be possible for the University to devolve more responsibilities to the Faculty. For example, effective promotion committees within departments could make recommendations to chairs who in turn will make recommendations to a Faculty promotions committee. The University will find that it can be less involved in such decisions under such an arrangement. The approval of minor curriculum changes should be devolved to the Faculty so that only major changes in programmes and new programmes are referred to the Senate.

To assist the dean, two associate deans will probably be required, one concurrence with academic matters and one for research initiatives. They should have term appointments which could either be made by the dean or made by the University on the recommendation of the dean.

To assist the dean, two associate deans will probably be required, one concerned with academic matters and one for research initiatives. They should have term appointments which could either be made by the dean or made by the University on the recommendation of the dean.

The associate dean responsible for academic matters would act on behalf of the dean in such matters as ensuring that university and faculty academic regulations are being followed throughout the Faculty. In addition he or she would be involved in the admission of undergraduate students, in the common first year, in the preparation of calendar material, in the administration of all final examinations in undergraduate courses, in the awarding of scholarships, and in recommending changes in any of these areas. Another associate dean would have special responsibility for promoting research activities, for industry/faculty relations, for space planning, for continuing education activities within the Faculty, and probably for the professional experience year (Recommendation 8).

Although most of the resources of the Faculty will now be under the direct control of departmental chairs, the dean should still have within his or her control sufficient resources for those activities which should be centralized. For example, one would not wish to decentralize the machine shop, some other facilities such as darkrooms and printing shops, and possibly some multi-disciplinary laboratories. It is also for the dean to have the funds necessary to permit

the purchase from departments of the teaching needed for First Year and certain common courses. In this way, the dean is able to ensure that the best teachers work with First Year students.

5. The Term of Office of Academic Administrators

It has been generally accepted by universities in Canada that academic administrators should have term appointments and that there should be a limit on the number of renewals. Ideally, one would want a system in which leadership and administrative abilities could be clearly demonstrated at the departmental level, and then at the decanal level.

Recommendation 3: That the term of office of a department chair be five years once renewable, and the term of office of the dean be seven year, normally not renewable.

It should be noted that both types of appointments would involve properly constituted search committees with the dean chairing the committees for departmental chairs and presumably the vice-rector(academic) chairing search committees for the dean. The search process would be essentially the same whether the incumbent is eligible for reappointment or not. After a search committee has identified the final two or three candidates, the members of the academic unit should be advised and given an opportunity to express their individual views. Such responses if negative might not change the opinion of the search committee but at least it would be aware of the nature and magnitude of any dissent.

6. The Dual Role of the Centre for Building Studies

After six years of planning, the Centre for Building Studies was established in 1977 with a mandate to address the needs of the building industry through educational, research, and technology transfer programs. Since then, it has achieved much in all three areas. Undergraduate and graduate programs in building engineering have been established and approved by organizations such as the Canadian Engineering Accreditation Board. The Centre has had substantial success in attracting research grants and has the added distinction of being one of the province's "Centres de Recherche", the only one in the Faculty of Engineering and Computer Science. Finally, the Centre because of its uniqueness assists in differentiating Concordia University from other universities in Quebec, and indeed in Canada.

The Centre for Building Studies is unique in another sense in that it is both an academic department and a research centre; its director attends meetings of the departmental chairs and of directors of centres. This unique dual role of the Centre for Building Studies is creating problems within the Faculty. First, the leaders and members of other centres have quite rightly gained the impression that the Centre for Building Studies is in an advantageous position, a position to which they should aspire for their centres. Another complication is that eventually some members of the academic staff of the Centre for Building Studies may find their academic freedom of enquiry restricted. But no academic staff member should feel compelled to remain within a research centre if her or his research interests become incompatible with those of the centre.

I am convinced that the dual role of the Centre for Building Studies should be eliminated. But how best can that be done so as to avoid damage to the Centre of Building Studies? That question was posed to the leadership of the Centre for Building Studies and I welcomed their suggestions which are attached as Appendix B. Having considered their views and others, it is clear that the transition from the dual role should be done carefully and with the cooperation of the three groups which supported the original formation of the Centre, that is, the University, industry and government. It is unlikely to be accomplished in less than 5 years but it is important that a clear signal be given soon that the function of centres within Concordia University is to promote the common research interests of a group of academic staff members.

The optimum solution will be found in the establishment of a Department of Building Engineering with the enhanced powers and responsibilities covered under Recommendation 2. Thus the academic programs and students in building engineering would be transferred to the new department within the Faculty, and the Centre for Building Studies would be a research centre possibly within the department. I use the work "possibly" because the Centre for Building Studies might see its role as being beyond building engineering, or even engineering itself. There is much to be done in building studies by specialists in such diverse fields as economics, sociology, fine art, and history.

Recommendation 4: That within five years an academic department of building engineering be created within the Faculty of Engineering and Computer Science which would assume responsibility for the academic programs and students in building engineering.

In the implementation of this recommendation, it is essential that the leadership and members of the Centre for Building Studies be fully involved and that they have confidence in the commitment of the Faculty and University to the preservation and enhancement of building studies at Concordia University.

7. The Department of Civil Engineering

The formation of the Centre for Building Studies in 1977 must have been a traumatic event for the Department of Civil Engineering. Some colleagues moved to the new Centre for Building Studies and others did not. I am unaware of how those decisions were made but presume that not everyone had free choice. Although the Department was able to hire new staff, one strongly suspects that the heart had been taken out it.

Since the events of 1977, the Department of Civil Engineering has had difficulty in maintaining coherence. The staff conflicts are widely known and are harmful to both the students and the Faculty. Although the research funds being won by members of the Department are quite reasonable, they do not compensate for the poor environment for learning. The current situation should not be permitted to continue.

One option would be to maintain the Department of Civil Engineering with its existing mandate and to rely on retirements to solve the problems arising from the staff conflicts. But this approach would still result in a small department with little chance of achieving substantial growth. The proportion of civil engineers in Canada in terms of the total number of engineers is unlikely to increase over the longer term and may even decrease somewhat. Further important components of civil engineering are now within the Centre for Building Studies.

A second option would be to reunite the staff in the Department with those in the Centre and form a new unit such as the Department of Building Studies and Civil Engineering. This course of action is not recommended because it would not solve the root problem and would be counterproductive to the successful discipline of building engineering at Concordia University. A third option would be to phase out the academic programs of the Department of Civil Engineering and dissolve the Department. It is my belief that this is the preferred option for the Faculty and University.

Recommendation 5: That the academic programs of the Department of Civil Engineering be phased out over the next five years and the Department dissolved.

Although this recommendation if implemented would deprive the University of certain opportunities within civil engineering, it would allow the University to further strength the other departments within the Faculty. If adopted, new enrolments to the doctoral program should be discontinued almost immediately followed by enrolments in the masters program. It is conceivable but unlikely that the bachelor's degree in civil engineering could be maintained even after the Department had been dissolved.

Between the date of making the decision and the actual dissolution of the Department, orderly and caring decisions could be made about future assignments for the staff. Presumably many of them could pursue successful careers within the new Department of Building Engineering.

8. Designations of Research Centres

In reviewing the documentation it became evident that Concordia University has either not codified the meaning of certain terms or not enforced a code. For example the word "centre" is being used in at least three different ways, for the dual role unit Centre for Building Studies, for purely research units such as Centre for Industrial Control, and for quite a different unit, Centre for Continuing Education. It is simpler for both the organizers of units and for those bodies which have to review and approve them if common meanings are ascribed to words such as "centres" and "institutes".

Recommendation 6: That Concordia University establish a task force which would codify the purposes of units such as Centres and Institutes, and the procedures for their establishment and dis-establishment.

It should be emphasized that this recommendation is not intended in any way as a criticism of the Centres within the Faculty.

9. The Undergraduate Student and the Faculty

During my visit I met five current fourth year students all of whom are student leaders, and four who had graduated between 1985 and 1988. All but one had chosen to come to Concordia University ahead of other university alternatives, believing that it had the better programs if not the better reputation. Paraphrasing the words of the alumni: "Years 1 and 2 were tough, and Years 3 and 4 were great". Taken together the four years had taught them how to learn quickly, to balance their time, and to work effectively in teams. Who could ask for more!

However, like students everywhere, these had identified some limitations of their Faculty, the most important being:

- the somewhat limited office hours for students to meet with academic staff.The reported average was 1 1/2 to 4 hours/week with an average of about 3.
- the possible over-emphasis on research at the expense of teaching
- some laboratories appear to be deteriorating
- the failure of all teaching staff to conduct the teaching evaluations.
- the lack of space for student common rooms and for student society offices.

Some of these matters are considered elsewhere in this report. However four issues of particular relevance to undergraduate students covered below.

9.1 The Transition to University

It had been my impression that Québec's system of CEGEP's ensures that students will have minimal problems with the transition to university-level studies. However it is apparent from discussions with both students and staff at Concordia University

and elsewhere that my presumption is incorrect. Too many new students are failing first year because of transition difficulties.

This issue was first tackled in 1973 when the Faculty of Applied Science, Queen's University, established its transition program. Their program which was modified in 1982 has proven to be very successful with about 70% of the incoming students who experience difficulty in adjusting being able to recover without the loss of time. Since then five other engineering faculties, all of them outside of Quebec, have introduced transition programs. Descriptions of these programs appear in the proceedings of the Eighth Canadian Engineering Education Conference held at Université Laval in May, 1992. Copies of four papers on such transition programs in Canadian engineering faculties have been sent under separate cover to Ms. Angela Wilson Wright, Assistant to the Vice-Rector, Academic.

In essence, transition programs permit students who encounter academic difficulty in their first term to immediately repeat course deferring others to the summer. Those who are successful are able to enter Second Year without the loss of a year. It has also been shown that they do better in Second Year than do similar students who had not elected to enrol in the programs. Typically 50% or more of the students who enrol in a transition program recover and proceed into Second Year with their original colleagues, but less than 25% succeed if they do not take advantage of the opportunity. Both the University of Toronto and Queen's University have found that existence of transition programs also reduces the stress on most students, and the drop-out rate in the fall term.

Recommendation 7: That the Faculty of Engineering and Computer Science examine the feasibility of introducing a transition program for new first year students.

It is probable that the format of the programs at the University of Toronto and at the University of Western Ontario will be found to be the most appropriate for Concordia University.

In addition to the increased success rate of First Year students, transition programs permit unsuccessful students to leave engineering with less regret. They know that even after repeating key courses they still could not cope and thus another career option should be pursued.

9.2 Cooperative Engineering Education

The students interviewed were strongly supportive of the Faculty introducing more opportunities for co-op engineering education such as the University of Waterloo, or the professional experience year (PEY) program at the University of Toronto as described in Appendix C. It would seem more feasible for the Faculty of Engineering and Computer Science to have the latter type of cooperative education program in which students work in industry or government for sixteen months after either Second or Third Year. Such programs are less expensive to administer, do not require summer teaching terms, and many employers prefer to have students for the longer period.

Recommendation 8: That the Faculty examine the feasibility of introducing a Professional Experience Year program for students who have completed Year 2 or Year 3.

9.3 Course Evaluations

It is my understanding that the current agreement with the union representing the academic staff does not require them to conduct course evaluations or to have them conducted by anyone else. It is not clear from the Faculty's self appraisal document whether my in formation is correct so I am presuming that it is. Properly conducted course evaluations provide very useful information to the lecturer, give the students an opportunity to express their collective opinion, and assist tenure and promotion committees in their assessment of staff.

Course evaluations are not appropriate for handling situations where the lecturer is failing as a teacher; in these cases the most useful approach is for students to bring the matter to the attention of the relevant academic administrator who then should take immediate action.

One successful approach to course evaluations is to first develop a common evaluation form for the Faculty which is endorsed by the Faculty Council. It should then be given to students during class time by the lecturer with the condition that students are not to discuss it with other students while completing the forms. The completed evaluation forms should be processed by the Faculty Office and the individual results along with faculty averages sent back to the different lecturers. Summaries are also placed in the departmental personnel files of staff members. Free comments should be written on separate forms and become the property of the lecturer.

Recommendation 9: That all academic staff in the Faculty be encouraged to conduct course evaluations, and that the university seek to have the union agreement modified so that course evaluations are required in all undergraduate courses.

Most staff members who are apprehensive of course evaluations need not be and should be encouraged to use them, even if only for their own benefit. After a system of course evaluations has been agreed upon by the community of academic staff it becomes an accepted part of university life. The key element in the implementation of course evaluation is for the senior academic body within the University to require that each faculty establish a system and that it be well documented.

9.4 The New Graduate as a Member of the Alumni

Finally, the engineering college at the University of Saskatchewan has for many years had a successful annual student-operated campaign in which graduating students make multi-year pledges to the College. This type of campaign has since been adopted by other engineering faculties typically yielding pledges of about $200 per student. Such programs have two very important benefits. First, they encourage new graduates to adopt what should be a life-long practice of financially supporting their school. Second, the relative success of such campaigns provides an immediate measure of the sense of satisfaction of new graduates. If most students make a pledge, one can be certain that their undergraduate experience was appreciated; on the other hand, if only a few are prepared to commit themselves, something was wrong and needs to be addressed quickly.

Recommendation 10: That the undergraduate student body with the cooperation of the academic leaders of the Faculty and Departments develop a graduating student gift program.

This possible recommendation was endorsed by the students to whom I spoke and thus I suggest that it be acted upon quickly so that the first campaign can be undertaken in the spring of 1993.

10. The Graduate Student and the Faculty

The students which seems to deserve particular attention are the graduate students. I should note that I am assuming that the ten graduate students whom I met were representative of their colleagues. Certainly nothing was said which has caused me to question their motives; they were committed to their Faculty and wanted it to continue to develop as a first-class engineering faculty. They also believe that they are involved in important research projects, they appreciate the small class sizes, and the location in downtown Montreal is great. At the same time, they identified certain improvements which would benefit all.

Perhaps the essence of their frustration is rooted in the observation of one student that "Concordia like Avis tries harder". Thus the academic staff work harder and they in turn expect the same from their graduate students. It would not be easy to establish the validity of this observation although it could be done through a study of the expectations of staff at Concordia University and at McGill University. Nevertheless their examples indicated that they have made their own assessments and some seem valid.

It should be noted that the recent introduction of the M.Eng degree as essentially a course-work degree is a positive change especially for engineers undertaking the degree on a part-time basis. The reduction in the course requirements from 8 to 6 for the M.A.Sc. degree is also welcomed by students and staff.

10.1 Time for Completion of Masters Degrees

One example of an assessment by graduate students which is borne out by independent data is the time required to complete a masters degree. The students suggested that it can take three years and even longer to complete the degree on the basis of full-time studies. Information in Table 26 of the Faculty's self appraisal document indicates that the average was 3 1/2 years although this may include a few full-time students who completed their degree through part-time studies. Even with that correction, the time to completion is excessive relative to most engineering schools and should be reduced to the more normal 18-20 months for an average full-time student.

Recommendation 11: That the Faculty examine ways in which the time to completion for a masters degree can be substantially reduced for those who are primarily full-time students.

10.2 Documentation on Procedures

Concern was also expressed that in some departments supervisors for masters students are assigned immediately on admission whereas in others the students had to locate their own supervisors. In most if not all departments it seems that students must identify their own research topics. There is also great variation in the expectations of graduate course lecturers with some courses requiring more than 30 hours per week and others less than 10. It would seem advisable for the five graduate units of the Faculty to examine collectively their procedures and expectations of graduate students and arrive at reasonably uniform understandings.

The graduate units in the Faculty should seek to ensure that the calendar listing of graduate course offerings are correct especially in terms of whether or not a course will be offered in a particular year. The long lead times for the publication of university calendars can make the latter suggestion difficult to achieve. The best way to overcome that problem is to have readily available graduate manuals which describe the graduate courses, programs and staff in each department. In this age of desktop publishing, it is relatively easy to produce annual updated booklets. These manuals should also include the key procedures and deadlines applicable to graduate students.

Recommendation 12: That the graduate units of the Faculty collectively examine their procedures and expectations of graduate students so that they can be documented for circulation among graduate students and staff.

10.3 Ph.D Comprehensive Examination

A review should also be conducted on the procedures being used in the various departments with regard to the Ph.D. comprehensive examination. In one or more graduate units the comprehensive examination is held within 12 to 18 months after initial registration in a Ph.D. program, but in another unit the examination was reported as being held between 2 and 4 years after registration and after much of the research for the degree has been completed. Ideally comprehensive examinations should be held within 18 months and certainly no later than 24 months after registration. Successful candidates should not have this examination interfering with their research effort and unsuitable candidates should be advised as early as possible so that they can

pursue other options. In any event, comprehensive examinations which sometimes involve difficult judgements should always be chaired by someone from a different discipline within the department with the chair being responsible for ensuring that the examination is conducted fairly.

Recommendation 13: That the Faculty's departments ensure that Ph.D. comprehensive examinations are held, as required by the existing regulations, within the first 18 months and in any event no later than 24 months after registration in the program.

The number of required courses in Ph.D. programs if frequently a subject of debate in Canada possibly due to the quite different practices in the United States and the United Kingdom. A strong argument can be made for keeping the number of required courses to a minimum. In addition, Ph.D. students especially should be encouraged to take courses in other universities if the most suitable ones are not offered at Concordia University.

10.4 Financial Support of Graduate Students

About ten years ago the association representing the teaching assistants at the University of Toronto succeeded in being certified as a union and since then has negotiated on behalf of all teaching assistants including those in the Faculty of Applied Science and Engineering. Undoubtedly the main reason for the success of the certification campaign was the issue of remuneration with the fairness of the process of assigning teaching assistantships being a secondary factor. As a result of the establishment of the union there have been two strikes but there is also the general perception that the system is now fairer.

I sense that the Faculty of Engineering and Computer Science could do much to improve this aspect of its relationship with its graduate students. For example, it has been suggested that teaching assistantships are quite variable in the amount of money per hour of work. This should not be continued and instead there should be a fixed rate per hour, probably based on whether the student is in a masters or Ph.D. program, and each assignment should specify the number of hours to be worked. The difference between the top rate and the bottom one should probably not exceed 20%.

Recommendation 14: That the rate paid for teaching assistantships be standardized and the number of hours per assignment established beforehand.

Whenever possible, offers of admission should include any awards and teaching assistantships. It was suggested that some applicants have been turned down because they requested financial support. This is certainly an unusual practice for applicants who are citizens or landed immigrants, although a common practice in some universities for most applications from foreign students. There is no harm in asking for financial assistance and nothing personal if none if granted.

Another concern relates to the international student fee remissions which are available to students in Quebec universities. Apparently these are awarded by Concordia University in blocks of 45 credits and thus if a student only needs assistance for 3 credits the remaining support is lost. The graduate students reported that McGill University awards them in blocks of as little as 12 credits. I suggest that the matter be examined so that a more equitable system can be devised if it is permitted by the regulations. On another matter and one which I report only, it was suggested that tax receipts are often not equal to the actual fees paid.

10.5 The Graduate Student as a Junior Colleague

Finally, much needs to be done to bring graduate students and academic staff together. Rightly or wrongly, many graduate students feel that their efforts are not appreciated. Is there a graduate student/staff coffee room? Is there a mentor program for new staff so that they have a better sense of what to expect from graduate students, be they teaching or research assistants? Have graduate students in each department been encouraged to organize social functions to which the staff would normally expect to attend?

Graduate students are in the work world of engineering and should be treated more like junior colleagues than as undergraduate students. I would also urge the Faculty to take full advantage of the strengths which the Engineering and Computer Science Graduate Student Association can offer.

11. Recruitment and Review of Staff

Three matters are considered under the general heading of recruitment and review of new staff.

11.1 Length of Initial Appointment

It was brought to my attention that new staff undergo their initial review about 18 months after being appointed. Thus these individuals must very quickly produce evidence in support of their potential as researchers. In my opinion, the first review should be deferred until mid-way through the third year of the initial appointment. The longer period will reduce the stress on the new staff member and permit them to place somewhat greater emphasis on developing their skills as teachers.

Recommendation 15: That the initial review of new academic staff members be conducted mid-way through their third year.

The Faculty of Engineering and Computer Science should also study the recently developed program at École polytechnique for helping new staff to gain confidence as teachers. The implementation of such a program would undoubtedly require some financial assistance from the University.

11.2 Hiring of Francophone/Bilingual Staff

One of the concerns of some individuals who contacted the Review Committee related to their perception that insufficient attention and commitment had been given to the engaging of academic staff who were bilingual, and to the encouragement of staff to become bilingual. Indeed it has been suggested that in at least one case a department deliberately avoided hiring a francophone because he was a francophone. That incident will be discussed further in Section 14.

It will be very difficult indeed to discover whether or not the Faculty could have hired more francophone or bilingual staff 10, 15, or 20 years ago. The records have likely been lost and memories are fallible. In any event the most important issue is whether or not the Faculty is currently making a reasonable effort to hire francophone/bilingual staff.

I have explored this matter with the departmental chairs, and with the Dean. All of them informed me of their efforts to engage francophone/bilingual staff and of their almost total lack of success. One chair noted that such hirings had top priority and indeed an implicit affirmative action program in effect. Another reported that out of 65 applications for a position, only two were francophone and they had been placed in the top 5. One of the two was offered the position but quickly declined, the other declined to proceed with his application even though the department was willing to shift its requirements to better match that of the candidate. Another case was quite similar but again the department was unable to attract either of the two top-rated francophone candidates. In yet another case, a list of francophones studying in the United States was obtained and all were contacted about joining the Faculty. None were willing to do so.

I am persuaded that the Faculty is making a reasonable effort to engage francophone/bilingual academic staff but the impediments to success are very real and mainly outside the control of the Faculty. From all reports, most potential candidates whether they be anglophone or francophone are currently attracted to positions outside of the province, and those who are willing to take positions in Quebec have very attractive options from which to choose. It should be noted that engineering faculties across Canada are having considerable difficulty in locating suitable young faculty members. It is not just Quebec universities which regard strong francophone/bilingual candidates as being particularly attractive.

It would seem that the most viable option for the Faculty is to implement with the help of the University an affirmative action program for the hiring of francophone/bilingual staff. One approach could be to identify excellent francophone or bilingual undergraduates in the Faculty, encourage them to do masters degrees at Concordia University, and then provide them with special financial assistance towards doctoral studies at another university on the understanding that the special assistance would be forgiven over two years in an academic appointment in the Faculty.

Recommendation 16: That the Faculty with the assistance of the University introduce an affirmative action program for the recruitment of francophone/bilingual academic staff.

11.3 Hiring of Female Staff

There have also been suggestions that the Faculty is adverse to the hiring of female academic staff. Again my discussions with the dean and departmental chairs convinces me that they are keenly aware of the need to hire women and have made every effort to do so. But the competition among engineering schools in Canada is fierce because all of them are seeking to recruit from the same very small pool.

In some ways university administrators are being unreasonable in their expectations of engineering faculties in this area. In less than 20 years the percentage of female undergraduate engineering students has gone from 3% to over 15% of the student body. One can argue that it should be even greater but that is to ignore home and pre-university school environments. Most parents still do not want their daughters to study engineering even if they are qualified, and there are few role models for young women who might consider engineering. In 1992 less than 4% of all registered engineers in Canada are women and unless the numbers in engineering faculties increases extraordinarily rapidly the proportion in the profession can not reach 15% for 25 years or more.

The problem in hiring female staff is complicated by the fact that many employers, especially governments and large corporations, are also seeking to hire them, frequently immediately after they have obtained their bachelors degree. Thus the proportion of women in graduate programs in engineering is even less than in undergraduate programs.

However the Faculty, like others in Canada, could be more pro-active in its hiring of women and thus in providing more role models for potential female students. But such a program would cost money. As suggested above for the hiring of francophones, the most able female undergraduates could be encouraged to undertake masters degrees at Concordia University on the understanding that if they do well they will be given special financial assistance to pursue a doctorate elsewhere. The special assistance would be forgiven over two or three years in an academic position in the Faculty.

Recommendation 17: That the Faculty with assistance of the University initiate a program of financial assistance which would encourage excellent women undergraduates to pursue graduate studies and thence academic careers.

The funds for such a program might well be provided by alumni organizations or corporate donors.

The Faculty should continue to encourage women to study engineering. One way in which to increase the numbers of

women undergraduates is to have female graduates speak to young women in CEGEP's and in high schools. Anything which can be done to provide role models to potential female students should be pursued.

It is my impression that the faculty and students in engineering schools throughout Canada have been supportive of young women in engineering. Unfortunately some of the antics of a few students have left the impression that engineering schools themselves are hostile to women. I have encountered no evidence in the Faculty of Engineering and Computer Science at Concordia University to support that view.

12. Continuing Education

Based on the two annual reports to which I had access it would seem that the Faculty is offering very few continuing education courses for engineering, technologists, and others in the Montreal area. This is regrettable both from the point of view of those who might take such courses and from that of the Faculty which could thereby perform a useful service and generate funds for other activities. Engineering faculties in large cities such Toronto and Montreal have special advantages in this regard because of the large numbers of potential registrants. It should be noted that often engineering faculties engage outside engineers to give continuing education courses which they themselves have proposed. In these cases, the Faculty acts as the screen to ensure that the lecturers and courses will meet the expected standards. At least one engineering faculty awards CEU's (Continuing Education Units) to their registrants.

One useful model is for the Faculty to give a member of the academic staff some release time so that he or she can promote the continuing education program. Although mainly a Faculty-level activity, a reasonable share of any net profits arising form such courses should be returned to the relevant departments.

The recently agreed upon memorandum of agreement between the Faculty and the Centre for Continuing Education provides the basis for cooperation but it requires initiative at the level of the Faculty. It is likely that there would also be advantages from cooperation in this area between Concordia University and McGill University.

Recommendation 18: That the Faculty become more assertive in the organization of continuing education courses in subjects of particular interest to engineers, technologists, and others.

13. The Labelling of Courses

Two matters related to the listing of courses came to my attention. The first concerns the practice of double numbering certain courses which are either totally or largely taught together as undergraduate and graduate courses. A review of the 1991/92 calender indicates that over 40 such courses have been given two labels in the Faculty of Engineering and Computer Science.

It is my opinion that double numbering should not be permitted primarily because it distorts teaching load statistics within a university. Normally, such statistics are derived from data which does not distinguish between two quite separate courses and two courses with different numbers which are taught as one. Thus an academic unit which uses double numbering is at an advantage to faculties which did not use double numbers. The solution to the problem is to define a range of numbers which are recognized as being available to both undergraduate and graduate students. For example, such courses could all have numbers in the 500's, and courses with numbers in the 600's would then only be open to graduate students. Apparently at Concordia University this solution might require the renumbering of some of the diploma courses but that should not be an insurmountable barrier given that diploma courses normally cover undergraduate material.

Recommendation 19: That the Faculty of Engineering and Computer Science seek to eliminate the practice of double numbering common undergraduate and graduate courses both within the faculty and within the University.

It was also brought to my attention that the calenders of the University and especially the graduate calendar list courses which have not been offered for three or four years. For some purposes it is convenient to list course which are temporarily not being offered, e.g., it avoids having to seek new approvals at a later date. However the disadvantage is that it conveys incorrect information to potential graduate students who later discover the true facts. It is important that courses which re not likely to be offered in any year by so indicated. Where a course is routinely offered in alternate years, that information should also be noted in the calendar along with precise information as to which years it will be offered. Finally, courses which have not been offered for three or four years should normally be removed from the calendar.

Recommendation 20: That the calendars for the Faculty contain reasonably precise information on the courses to be offered in any one year.

Although not included as a recommendation, a very strong case can be made for each faculty within Concordia University having its own undergraduate calendar. Such calendars could greatly reduce the time between the submission of proposed curriculum changes and their appearance in a calendar. All textual changes could be made within the Faculty even if the actual printing is done through a university-wide contract. Certain common material could be provided from a central source.

14. Internal Tensions Within the Department of Civil Engineering

I was dismayed to hear from multiple sources about the tensions which exist within the Department of Civil Engineering. Clearly something is wrong when undergraduate and graduate students are so aware of the open conflicts. No matter what the reasons and when they occurred, the current situation is clearly inappropriate.

One issue which might have contributed to the current situation is the matter of what was said or not said at a staff meeting in 1983. It seems clear that someone suggested at that time that a francophone should not be hired because if you did they would soon take the place over. Was it said as a cheap debating point? Was it said in jest? Was it a rhetorical question which was misinterpreted? If it was simply a misunderstanding, why has it been brought up nine years later. Or were the two factions already in such conflict that it became one more reason to maintain the battle lines?

An earlier version of this report included a recommendation that the staff in civil engineering who attended the 1983 meeting collectively express their regret for any misunderstandings which have arisen from the incident. The recommendation has been removed because Concordia University is not a grade school where pupils write out lines.

Simply stated, it is unfortunate that the incident ever occurred but it is even more regrettable that those at the meeting have been unable to put it behind them.

15. Last But Not Least

The Industrial Liaison Office has an important role to play especially in these times when universities are seeking to increase their financial returns from inventions and discoveries. There would appear to be strong arguments for the three Montreal engineering faculties to develop a co-operative approach to obtaining patents for new inventions. Such a resource unit is likely not affordable by any one faculty but financially viable if the costs can be shared. It is suggested that the Faculty of Engineering and Computer Science take the lead in examining the feasibility of creating a common office for obtaining patent protection of discoveries.

16. Conclusion

The Faculty of Engineering and Computer Science is a strong academic unit within Concordia University, one which is gaining ever increasing recognition from engineering educators in Canada and abroad. This position of strength has been established over a relatively short period, largely due to the energy of its staff, both academic and support. In such circumstances it is not surprising that some members of the Faculty lack enthusiasm for the recently introduced university reviews. Most faculties in other universities have had to be persuaded about such reviews but they have proven to be valuable exercises, especially in producing improved communications between faculty and university. Once the initial resentments have been overcome, these faculty reviews, like course evaluations, become accepted and appreciated procedures.

Report Appendices

Appendix A
Itinerary of Visit to Concordia University

Appendix B
Correspondence from the Centre for Building Studies

Appendix C
Description of Professional Experience Year

Appendix A1
Itinerary for External Consultant: Peter M. Wright, University of Toronto

Sunday March 22
Dinner with Dr. Rose Sheinin, Vice-Rector, Academic

Monday March 23
8:30 - 10:00 Meet Review Committee - Location: Room BC 110

10:15 - 11:30Meet with Decanal Team - Location: Room BC 226

- Prof. George Xistris, Assistant Dean, Planning and Priorities
- Prof. Terrill Fancott, Associate Dean
- Prof. F. Douglas Hamblin, Associate Dean
- Prof. Thiagas S. Sankar, Special Coordinator, Research & External Relations

Noon - 2:00 Lunch with Discussion about research - Host: Prof. Jack N. Lightstone, Associate Vice-Rector, Academic (Research)

- Prof. Thiagas S. Sankar
- Mr. Roch Prud'homme, Director, Industrial Liaison Office, Research Services

2:15 - 3:45 Research Centre/Group Directors - Host: Prof. Thiagas Sankar, Location: BC 226

- Prof. Seshadri Sankar, Director, CONCAVE
- Prof. Ching Y. Suen, Director, CENPARMI
- Prof. Richard M. Cheng, Director, Centre for Industrial Control
- Prof. P. Fazio, Director, Centre for Building Studies, SIRICON
- Prof. Asim J. Al-Khalili, Representative VLSI (Inter-disciplinary)
- Prof. Hershey Kisilvesky, Director CIMCA (Inter-Faculty)
- Prof. M. Omair Ahmad, Representative SIPCOM

4:00 - 5:30 Meet with Graduate Program Directors - Host: Dean Martin Kusy, Acting, Dean, Graduate Studies - Location: S-Annex, Room 205

- Prof. Dorel Feldman, Graduate Program Director, Centre for Building Studies
- Prof. Amrughur Ramamurthy, Graduate Program Director, Civil Engineering
- Prof. Thiagas S. Sankar, Program Director, M.Eng. Aerospace

- Prof. Georgios Vatistas, Graduate Program Director, Mechanical Engineering
- Prof. Clement Lam, Graduate Program Director, Computer Science
- Prof. M. Omair Ahmad, Graduate Program Director, Electrical and Computer Engineering
- Prof. Terrill Fancott, Associate Dean

6:30 Dinner with Dean Swamy

Tuesday March 24

9:00 - 12:00 Meeting with Chairs - Location: Room BC 224

9:00 - 9:30 Prof. Phoivos D. Ziogas, Chair, Electrical and Computer Engineering

9:30 - 10:00 Prof. Vangulur S. Alagar, Chair, Computer Science

10:00 - 10:30Meet with Ms. Bernice Goldsmith, Social Aspects of Engineering - Location: Room BC 224

10:30 - 11:30Meetings with Chairs - Location: Room BC 224

10:30 - 11:00Prof. Paul Fazio, Director, Centre for Building Studies

11:00 - 11:30Prof. Oscar A. Pekau, Chair, Civil Engineering

12:45 - 2:00 Lunch with Ms. Corinne Jetté - Women's Issues & Literacy - Meet in Room BC 224

2:00 - 4:00 Meet with Undergraduate Students - Host: Guy Vézina, Location: Room BC 110

4:15 - 5:15 Meet with support staff - Location: Room BC 110

6:00 - 7:00 Meet with alumni - Location: Room BC 110

Wednesday March 25

9:00 - 11:00 Meet with Graduate Students - Host: Honna Segel, Location: Room H 769

11:30 - Noon Meet with Dean Swamy - Location: Room BC 226

Noon - 2:00 Lunch with Dr. Rose Sheinin, Vice-Rector, Academic

2:00 - 3:30 Meet with Senior Faculty - Location: Room H 769

3:30 - 4:00 Meet with Chair, Department of Mechanical Engineering: Prof. M.O.M. Osman - Location: Room BC 226

4:30 - 6:30 Meet with Review Committee - Location: Room BC 110

Appendix B1

These notes have been prepared at the request of Dr. Peter Wright, external consultant for the review of the Faculty of Engineering and Computer Science - March 23-25, 1992

Centre for Building Studies

Background

After six years of planning by the University, industry, and government representatives, the Centre for Building Studies was established in 1977 to address the needs of the building industry through educational, research and technology transfer programs. The resolution passed by the Faculty and adopted by the Board of Governors enabled the Centre to administer a mandate for educational programs and, also, to develop and implement research programs sponsored through the negotiated development grant.

In its first 15 years of existence the Centre moved from one successful venture to another. Solid programs were developed with a good student base at the undergraduate, masters, and Ph.D. levels. The undergraduate program in Building Engineering was accredited by the Canadian Engineering Accreditation Board in 1981. The Co-Op option was established in 1987. An impressive 38% of the students enrolled in the undergraduate program in the Centre are women, approximately double the Canadian rate. Among these women graduates are a number of high achievers who provide potential candidates for graduate studies and future members of faculty.

The Centre has established an excellent reputation in this new discipline both in Canada and abroad. It attracts the second highest per capita grant in the University (most current available data 1989-90), a particularly impressive achievement considering the relatively young and multi-disciplinary (civil, chemical, mechanical engineering, and architecture) faculty and the acceptance it has had to generate within a peer system that has yet to determine its community of peers. The strategy in developing this faculty in the Centre for Building Studies was governed by its academic mission. Therefore, it behooves the University to sustain the growth of this unique initiative which has not been undertaken by other Canadian universities.

Unlike most other provinces, Quebec has a special program to fund teams and "Centre de Recherche". The CBS has one of the largest funded teams in the province as well as the only funded "Centre de Recherche" in the Faculty of Engineering and Computer Science (out of four for the entire University). These resources are crucial to the programs in the CBS and they have supported the development of research and educational programs as well as unique facilities. Therefore, any disruption in the flow of external support would greatly jeopardize the current operation and future advancements in building engineering and research.

Appendix B2

Issues to be Addressed

The Centre has occupied rented space that has been inadequate for the development of its facilities and programs considering the level of rent it pays and the opportunities that exist both internally and externally to the University. An arrangement should be made whereby the Centre can eventually occupy University owned space, built to accommodate its special needs. The University should give serious consideration and priority to the intelligent building project proposal by the CBS. In addition, given the interaction between the Centre and industry and government, the University should assist the Centre in the establishment of chairs in the building envelope and indoor environment and follow-up with its commitment of a senior faculty position in this area. The Centre has a significant profile outside the University which can be used to profit the University.

Structure

The Centre for Building Studies has been able to meet well the requirements of a department within the University and to develop the profile of a major Centre external to the University.

There are those who would prefer to have the CBS renamed as a department of building engineering to provide symmetry within the Faculty of Engineering and Computer Science and have a Centre perhaps within such a department. In our view, the advantage of symmetry for such a modification is far outweighed by the high risk of losing external support and undermining the Centre's image. The present structure qualifies the Centre for the Centre de Recherche whereas Centres in other departments are not so qualified and it is doubtful whether they will acquire the critical mass and cohesion required to be successful under this program.

It may be possible to retain the present structure, yet delineate more clearly the departmental role and the Centre's role without jeopardizing the successes to date. The director of the Centre should be invited to enter into a dialogue where the concerns and opportunities of the Centre can be ventilated and where the University may vent its concerns regarding the Centre. The present structure of the Faculty has not been successful in providing the appropriate friendly climate to do so and a recommendation should be sought from the Centre as to the format for such a dialogue.

In our view, the university should draw from the wisdom, commitment, and achievements of the Centre to establish the next phase of development. It should consolidate itself as the Centre where the people from different professional backgrounds would come to improve their knowledge base related to buildings. The research component and the programs accessible through the Centre's character are necessary to draw in needed resources to do this. The area of building extends beyond engineering and is a place where non-engineering programs can be developed in conjunction with other faculties or even universities.

Appendix B3

There is a case which can be made in elevating the Centre for Building Studies to an entity in the form of an institute reporting directly to the Vice-Rector, Academic. Such an entity would house the programs in building engineering (department role), and it could develop other educational or research and technology transfer programs. The department module would be a subset of this institute and naturally would report to the dean of the Faculty. However, all resources (personnel, space, laboratories, equipment) would be shared. This type of institute would ensure the focus on Concordia for activities in building studies.

Clearly, at present, this is a sketchy idea. If there is an interest on the part of the University for such a development ample time should be provided - say 5 years - for further discussions and dialogue. To this end, the CBS should be given a mandate to develop this model in collaboration with industry, government and the university. It is imperative that both industry and government agencies should fully participate and advise the university of any potential shortcomings of such an approach. At the same time the additional resources required for such an undertaking should be identified and negotiated. If this route is to be selected the stability and the development of CBS in its current format should be warranted for any transition period.

Appendix C1

Professional Experience Year (PEY) at the University of Toronto

Appendix C2

- PEY Benefits
- What is the Professional Experience Year and What are its Benefits?

The Professional Experience Year (P.E.Y.)

- is a unique industrial internship program which
- was initiated by this Faculty in 1980 to meet the growing demands from industry for students with professional practical experience;
- is offered to students who have successfully completed at least their 2nd year of academic studies and wish to participate either between their 2nd and 3rd year, or 3rd and 4th year of academic studies;
- consists of a non-compulsory 12 to 16-month, one-time-only, continuous work period;
- which begins May 1st of one year and typically ends August 31st of the following year;
- began with the placement of 8 students;
- went to a low of 4 in 1984 and has grown phenomenally since then to;
- a placement of 100 students for the current year;
- name and logo of PEY has been trademarked and applies to the University of Toronto only;
- permits students sufficient time to initiate and to carry out projects of major length and intensity;
- permits students to perform duties far beyond the expectations of their academic level;
- permits students to supervise the traditional 4-month co-op student or the oncoming 16-month internship student;
- offers continuity and stability to a project;
- frees supervisor to go on to other projects;
- the 12 to 16-month employment period permits an excellent return on the training investment;

Appendices C3 & C4

Work/Sequence Sequence (For Second Year Students)

	Fall Term	Spring Term	Summer Term
Year 1	study	study	vacation
Year 2	study	study	work
PEY	**work**	**work**	**work**
Year 3	study	study	vacation
Year 4	study	study	graduation

Work/Sequence Sequence (For Third Year Students)

	Fall Term	Spring Term	Summer Term
Year 1	study	study	vacation
Year 2	study	study	vacation
Year 3	study	study	work
PEY	work	work	work
Year 4	study	study	graduation

(PEY consists of a 12 to 16-month one-time-only, continuous work period)

Average Salary Range for 1991-92 Work Session

$23,280 to $29,600 per year plus overtime when requested by company. Students are entitled to statutory holidays and 4% vacation pay.

Note: The PEY Office does not enter into financial negations between company and student

Number of PEY Graduates Rehired by their Interships

Year student worked in PEY	No. of students returning to PEY workplace upon graduation	Percentage of those returning
1985-8616%	4 (out of 25 placed in PEY)	16%
1986-8744%	14 (out of 32 placed in PEY)	44%
1987-8827%	13 (out of 49 placed in PEY)	27%

Activity Schedule for the 1992-93 Session

Note: the sooner job descriptions are received and posted for review by students, the better chance companies have for attracting the best and most suitable students.

	Year 1991
Job descriptions from companies received by PEY Office as early as possible for posting, but no later than	December 20
	Year 1992
Final date on which applications accepted by PEY Office	December 23 5:00 p.m.
Student applications submitted to participating companies by	January 10
Lists for interview submitted to PEY office as soon as possible but no later than	January 17
Interviews set up and students notified weeks of	January 20 January 27
Interviews held the weeks of	February 3 February 10
Reading Week (Students away)	February 17
Rankings submitted to PEY Office by	February 21
Rankings posted for students	February 25
Acceptances by students submitted to PEY Office by	February 26
Participating companies notified of acceptances	February 26 to February 28

- orientation and training is usually completed during the first 2-3 months; once this is accomplished, no further training is required for the remaining 14 months of employment;
- a PEY term plus a further 4-month term the following summer with the same company makes the student perfectly groomed to the participating company's needs and enables the student on graduation to take on a permanent position without further training;
- positive benefits will result for the firm's other recruiting efforts (both summer and permanent);
- the lengthy interaction between students and employers will help to ensure that academic education is relevant and in advance of present practice.
- an opportunity for education beyond textbook!

Appendix C5
Explanation of Placement Process for Interviewers

1. On completion of each interview session, first indicate at the top right hand corner of your interview schedule the number of positions you wish to be filled. Next, please list, in order of preference, those students you are prepared to hire for the work term. A copy of the Interview Schedule is provided for this purpose.

2. When interviews from all participating companies have concluded, your position will be offered to the student indicated as your first choice.

3. Should your first choice decline, the position will then be offered to the next available student from your list. The procedure will be repeated with all available students you have selected, until an acceptance is received for the number of positions you have indicated you wish to be filled.

4. Please complete one Interview Schedule form for each separate job description which you have provided. The student's name must appear on each list in order for the student to be considered for more than one of your positions.

5. If you have posted a general job description, please complete only one form. Record on the form the number of positions you are willing to provide based on the candidates you have interviewed. simultaneous offers corresponding to the number of openings recorded will be provided in each round of offers. (i.e.: with 5 available positions, job offers will be given first to the top five candidates and then to second and third placements until your quota is filled.

6. Please return the completed form to the PEY Office or the Information Desk of the Career Centre before you leave. You are urged to rank as many students as you feel are "trainable" for your job. In this way, you won't miss out on obtaining a student who could be offered a job elsewhere.

Today's PEY Students... Tomorrow's Industrial Leaders!